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THE IRON TRADE REVIEW

A Weekly Journal Devoted to the Machinery, Metal-Working and Foundry Trades, and Iron and Steel Manufacture.

VOLUME XXXVII — CLEVELAND, OHIO, JUNE 9, 1904 — NUMBER 23

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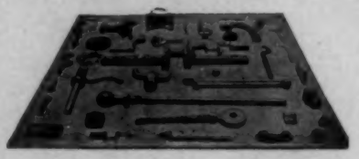

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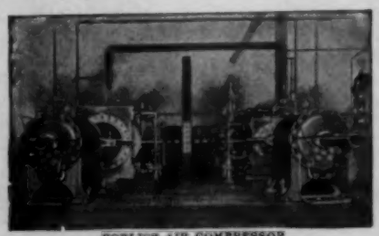

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SUPPLEMENT TO
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JUNE 9, 1904

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THE IRON TRADE REVIEW

VOLUME XXXVII CLEVELAND, OHIO, JUNE 9, 1904 NUMBER 23

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

Breaks have come in the ranks of the lake captains in the past week and a beginning has been made in what may soon be a considerable movement of lake vessels. On the other hand the strike leaders, through affiliation with the American Federation of Labor, are seeking to save themselves from defeat by drawing into the contest unions with which the Lake Carriers' Association already has contracts. Meantime many thousands of lake wage earners are kept in idleness and important interests are suffering, though with the exception of two or three furnaces the iron trade could go on for some weeks without serious inconvenience from the non-shipment of ore. Indications are that the breaks of the past few days are the beginning of the end of the tie-up; a collapse may be delayed but the defeat of the union now seems certain.

Curtailment of pig iron output due to lessening consumption is a development from which more promises to be heard. Two furnaces in the Pittsburg district are out and four in the Mahoning and Shenango Valleys, while at six additional Valley stacks preparations for going out are now making. On July 1 will come a very heavy curtailment movement among steel works and rolling mills, in part due to expiration of wage scales and in part to the shrinkage of orders. Wage settlements are not likely to be easy. The conference now in session on the bar iron scale has developed a distinct contest. Manufacturers insist that conditions call for reductions. In the tin plate scale the workmen have introduced a proviso calling for 5 percent wage increments on each 10 cent advance in the price of plates, instead of 2 percent increments as heretofore. In general the refusal of the men to recognizing the change that has come over business promises a deadlock that may last for weeks. Apart from wage considerations, some rolling mills are preparing for a shut down throughout July and in certain cases continuing through August.

Apart from a few conspicuous instances in which large requirements are under consideration, the pig iron market is uninteresting. While sales have been made at $9.25 Birmingham for Southern No. 2 purchases by analysis and in some cases by grade have been made at $9. The 12,000-ton purchase of an Ohio pipe works referred to last week, involving Nos. 3 and 4, was closed at a shade below $8.25 Birmingham for No. 4. It is reported that the leading harvesting machine interest is in the market for 25,000 to 30,000 tons of foundry iron, but contracts have not yet been made. In general Central Western furnaces are quoting $12 at furnace for No. 2 foundry iron. In Eastern districts Northern iron gives indication of having touched bottom and the blowing out of further Pennsylvania stacks is expected.

It is understood that the Wheeling bidder on the Pennsylvania tunnel castings will receive in all 50,000 tons of this work, leaving the screw piles to be awarded elsewhere. The iron in this contract is expected to come largely from Northern furnaces.

In some lines of finished material fair specifications are coming in, but the expectation of lower prices later in the year affects all buying. Tonnage on the books of the mills after July 1 is not plentiful and the increase of production in some lines, as in structural steel, in the second half of the year is a factor buyers are taking fully into account. The placing of 3,000 steel cars by Harriman roads will bring 30,000 tons of business to plate and structural mills, chiefly to the Pittsburg district. A reduction of $2 a ton was announced by the leading sheet interest at the opening of the week. This brings No. 28 black sheets in ordinary lots to 2.20c at mill, a concession from this price being made on 1,000-ton lots. Low priced bar iron purchases for car work in the Chicago district are reported, independent Indiana and Ohio mills dividing the tonnage. On hoops and bands the manufacturers have established a new agreement, the former being advanced $3 a ton, while bands, after weeks of sharp competition, have been reinstated on the steel bar base.

Export business at low prices continues to be negotiated in considerable volume. Some particularly low figures on export plates are reported, approximating the domestic prices of the depression of '93 and following years.

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
429 PARK BUILDING, June 8.

General conditions in the iron and steel trade remain practically unchanged, and the curtailment of buying in all lines points to the shutting down of many furnaces and steel plants during the summer months. In the Mahoning and Shenango Valleys the blowing out of furnaces has already commenced. Four stacks that had been operating the greater portion of the year are now idle and six additional furnaces are preparing to go out. Two of the Steel Corporation furnaces in this district are inactive, but it is doubtful if any other stacks will be banked or blown out this month, although iron production will be curtailed in July. Consumers generally are buying to cover immediate requirements only, and are insisting on prompt shipments, which indicates that practically no stocks are being carried. The present falling off in demand is not an unusual one, however, as this condition, previous to the boom years, was generally expected in the summer. Consumption thus far this year has been exceedingly heavy, and with a revival in demand later in the year, iron and steel manufacturers generally predict that 1904 will average up fairly in the matter of tonnage.

The leading manufacturers of hoops and bands held a meeting in this city last week and re-established uniform prices. Very low prices have been ruling on both hoops and bands and further cutting is to be prevented. Bands were re-established on the bar base, while hoops were advanced $3 per ton to 1.55c. The leading sheet producer announced this week a reduction of $2 a ton on both black and galvanized sheets, making the basis for 28 gauge black sheets 2.20c. This price, however has been ruling for several months. Although the price to the trade was 2.30c, a concession of 10 cents was allowed on carload orders. Whether this same concession is to be made on the new list cannot be learned, but to large buyers a price of 2.10c is made on 28 guage, in 1,000-ton lots. We note the sale of 150 tons of black sheets by an independent mill at 2.15c, and 2.10c could be done on 300 tons. With sheet bars selling at $24, it is difficult to see how independent manufacturers can meet the new sheet prices, although a large tonnage of black sheets was placed with an outside mill ten days ago on the basis of 2.10c. Orders for

3,000 steel cars were placed by the Harriman lines last week, the Pressed Steel Car Co, receiving 2,000 cars and the American Car & Foundry 1,000. About 30,000 tons of plates will be required in their construction.

The conference to establish the 1904-05 bar scale between the manufacturers and the Amalgamated Association opened at Cambridge Springs yesterday. A reduction in wages will be insisted upon by the manufacturers and the indications point to a protracted session. No date has yet been fixed for holding the sheet and tin plate wage conferences, but it is probable that they will be held next week. The demands of the tin plate workers for an advance of 5 percent in wages for every 10 cent advance in tin plate, will not be granted, as the custom for years has been to allow only a two percent advance for each 10-cent advance in tin plate.

Pig Iron.—The market continues quiet and little new business is being placed. A number of merchant furnaces are preparing to go out and by the end of the month pig iron production in the Mahoning and Shenango Valleys will be curtailed fully 40 percent. This week the Carnegie Steel Co. blew out its stack at Niles, O., and the Claire furnace at Sharpsville was blown out on Saturday. The Republic Iron & Steel Co. has its Atlantic and Hannah furnaces banked. Among the merchant furnaces that will go out this month are Mary at Lowellville; McKeefrey at Leetonia; Stewart and one Shenango at Sharpsville; Struthers, Struthers, O.; Ella, West Middlesex. The list will probably be increased before the end of the month, although a few merchant furnaces intend to run through the summer. Preparations are also being made to blow out another Valley stack at an early date, but a stack now idle will be blown in to replace it. In the Pittsburg district the Neville Island furnace of the American Steel & Wire Co. and one of the three furnaces of the Isabella plant of the Carnegie Steel Co. are the only steel works furnaces not in operation. At New Castle the Carnegie Steel Co. has two new stacks under construction and one will be available this month. On No. 2 foundry iron $12 to $12.15 at the furnace is the minimum, while on Bessemer iron, a few small sales have been made at $12.40 and $12.50 at the furnace. However $12.25 could be readily done, and on a desirable order there would be no difficulty in doing $12. On basic $12.85, Pittsburg is quoted, but there is no buying. We note the sale of 1,000 tons of foundry iron for delivery during June and July. Part of this iron went to Southern producers and the No. 2 foundry went at slightly below $9 Birmingham. The fact that this was resale iron accounts for the low price. A number of Southern furnaces are still holding foundry iron at $9.25, Birmingham, although others will do $9 for prompt delivery. Our quotations are as follows:

Bessemer, Valley	$12 15 to 12 25
Bessemer, Pittsburg	13 00 to 13 10
No. 1 Foundry	13 25 to 13 50
No. 2 Foundry	12 85 to 13 00
Gray forge, Pittsburg	12 50 to 12 75
Chilled basic, Valley	12 00 to 12 15
Chilled basic, Pittsburg	12 85 to 13 00

Steel.—The large producers are firmly adhering to association quotations, although outside mills are shading prices fully $1 per ton. Little business is being offered and the market remains quiet. Agreed prices are as follows: Bessemer and open-hearth billets, 4 x 4 inches, and slabs up to and including 0.25 carbon, $23, Pittsburg, Wheeling, Valley, Johnstown, Ashland, Ky., Ironton, O., and Lorain, O.; 0.26 and including 0.60 carbon, $1 advance; and 0.61 to 1.00 carbon, $2 advance. Billets smaller than 3⅞ inches and sheets and tin bars are $1 per ton extra. Bessemer and open-hearth rods are still quoted at $30 to $31 Pittsburg.

Muck Bar.—The market is quiet, and neutral bars are held nominally at $25 to $25.50, f. o. b. mill, Pittsburg.

Skelp.—Low prices are being made on steel skelp, one lot of 1,800 tons having been placed that netted the mill a little better than 1.30c. Grooved iron is held at 1.40c to 1.45c and sheared at 1.47½c to 1.50c.

Rails and Track Material.—New business in standard sections is light, the railroads evidently having covered for all the large work contemplated for this year. Competition on light rails continues very keen however. We make the following quotations: Standard sections, 50 pounds and over, in lots of 500 tons and over, $28; car lots and less than 500 tons, $30; less than car lots, $32; light rails, 16 to 25 pounds, $23 to $24; 25 to 40 pounds, $21.50 to $22. Track material: Spikes, 1.65c to 1.70c.

Plates.—Orders for 3,000 steel cars were placed by the Herriman roads last week, 2,000 going to the Pressed Steel Car Co., and the remainder to the American Car & Foundry Co. About 30,000 tons of plates will be required in the construction of these cars. The Pressed Steel Car Co. now has orders for about 4,000 steel cars, and the McKees Rocks plant is running full this week for the first time in many months. Plate prices are being shaded by outside mills from $2 to $3 per ton, while the Pressed Steel Car Co. is securing plates below the present prices on its sliding scale contract. We make the following quotations: Tank plates, ¼ inch thick and up to 100 inches in width, 1.60c at mill, Pittsburg; flange and boiler steel, 1.70c marine, ordinary firebox, A. B. M. A. specifications, 1.80c; still bottom steel, 1.85c; locomotive firebox, not less than 2.10c; and it ranges in price to 3c. Plates more than 10 inches, 5c extra 100 pounds. Plates 3-16 inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra. These quotations are based on carload lots with 5c extra a hundred pounds for less than carload lots. Terms, net cash, in 30 days.

Spelter.—The market is weak and continues to decline. Prime western grades are held at 4.75c to 4.78c Pittsburg.

Wire and Wire Nails.—Prevailing prices are being shaded fully $1 per ton on both wire and nails. New business is light, but this is customary at this season of the year. We make the following quotations: Wire nails, carload lots to jobbers f. o. b. cars Pittsburg, are quoted $1.90 base; plain wire, carload lots, $1.80 base; barb wire, carload lots, $2.20 base; staples, carload lots, $2.05 keg. Galvanized, 30 cents extra. Carload lots to retailers are held at 5 cents advance in all lines, and on less than carload lots a further advance of 10 cents is charged. Steel and iron cut nails, carload lots, $1.75, and less than carload lots, $1.80 f. o. b. Pittsburg, plus freight to points of destination. Terms, 60 days, less 2 percent off in 10 days.

Merchant Steel.—Current demand is not heavy and specifications on existing contracts are very light. Prices however remain unchanged as follows: Toe calk, 1.90c; carriage spring steel, 1.75c; tire steel, 1.65c; plow steel, 6 inches and under, 1.40c for Bessemer and 1.40c for open-hearth; plow slabs, ¼ inch and heavier, 1.65c. The demand for shafting on the part of the machinery manufacturers is not heavy, and tonnage has therefore been considerably affected. Drawn and cold rolled shafting is held at 52 percent off in carload lots and 47 off in less than carloads.

Pipes and Tubes.—A meeting of the independent pipe manufacturers was held in this city last week. All of the independents are meeting the prevailing prices on steel merchant pipe and are offering still further concessions. An Ohio mill reports the receipt of a contract for 500 tons of 16-inch pipe for the Kansas gas field. The tonnage on merchant pipe is by no means heavy, but on the larger sizes all of the mills are booked ahead and the market is strong. Discounts to consumers, carload lots f. o. b. Pittsburg, plus freight to destination according to Tube Rate Book are revised as follows:

MERCHANT PIPE.

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
⅛, ¼, ⅜ inch	69	59	66	56
½ inch	72	62	69	59
¾ to 6 inch	76	66	73	63
7 to 12 inch	71	61	68	58
Ex. stg., plain ends, ⅛ to 8 in.	68	58	64	54
Double ex. stg., pl. ends, ½ to 8 in.	60	50	56	46

BOILER TUBES.

	Steel.	Iron.
1 to 1½ inch	42½	39
1¾ to 2¼ inch	55½	38
2½ inch	58	43
2¾ to 5 inch	64½	50½
6 to 13 inch	55½	38

Bars.—At a meeting of the hoop and band manufacturers held last week hoops were advanced $3 a ton. Prices of bands were reaffirmed and take the steel bar base. There has been considerable cutting in both hoops and bands in the past, and prices have been extremely low for such highly finished products. Bar iron, 1.30c to 1.35c Pittsburg, for local delivery, while for Western shipment quotations are based on 1.25c to 1.30c Pittsburg. Hoops are held at 1.55c base, and bands at 1.35c taking bar extras. Bessemer steel bars, 1.35c; open-hearth, 1.40c; plow beams and cultivator beams, 1.35c, net; channels, angles, zees and tees, Bessemer, under 3 inches, 1.45c. The following differentials are maintained on steel: Less than 2,000 pounds of a size not less than 1,000 pounds, 10 cents advance; less than 1,000 pounds of a size, 30 cents advance.

Structural Material.—Mills report that the tonnage during May was heavier than during any month this year. The orders, while generally calling for small lots, covered a wide range, and several mills have sufficient tonnage on their books to insure full operations for three to four weeks. The Pennsylvania Railroad Co. will shortly send out specifications for the construction of a new freight depot at the Point. The Wabash elevated track contract has not yet been placed. Prices remain unchanged as follows: Beams and channels, 3 to 15 inches, 1.60c; 18 to 24 inches, 1.70c; tees, 1.65c; zees, 1.60c; angles, from 3 to 16 inches, 1.60c; universal mill plates, 1.60c.

Sheets.—A reduction of $2 a ton on both black and galvanized sheets was announced by the largest producer this week. This reduction however merely meets the market as 28 gauge black sheets have been selling at 2.20c for several months. On 1,000 ton lots 2.10c will be done, however. We note the sale of 150 tons of black sheets by an independent interest on the basis of 2.15c, and 2.10c has also been done by outside interests for less than 1,000 ton lots. We revise quotations for black sheets, carload lots as follows: No. 8, 1.65c; No. 9, 1.70c; Nos. 12-14, 1.75c; Nos. 15-17, 1.85c; Nos. 18-21, 1.95c; Nos. 22-24, 2c; Nos. 25-26, 2.05c; No. 27, 2.10c; No. 28, 2.20c; No. 29, 2.50c; No. 30, 2.60c. Galvanized: Nos. 12-17, 2.30c; Nos. 18-21, 2.45c; Nos. 22-24, 2.60c; Nos. 25-26, 2.80c; No. 27, 3c; No. 28, 3.20c; No. 29, 3.60c; No. 30, 4c.

Coke.—During the past week upwards of 1,000 ovens in the upper and lower Connellsville region were shut down. Additional ovens are preparing to go out and coke production is to be curtailed. On furnace coke, strictly Connellsville, as low as $1.40 has been done, while outside coke has been selling at $1.25 to $1.35. Foundry coke is held at $1.85 to $2 for strictly Connellsville grades. During the week ending Saturday, May 28, the production of the upper region reached 208,924 tons and of the lower region 56,118 tons. In the upper region there were 4,466 ovens idle and in the lower region 943.

Old Material.—The mills are not buying material, and the dealers are loading up on all the low priced stock that is being offered. Heavy melting stock is held at $11.50 to $12, gross tons, and cast scrap at $11 to $11.25. Rerolling rails are easier and are held at $12.25 to $12.50.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1164 MONADNOCK BLOCK, June 7.

Trading in iron and steel in the past week has been on a moderate scale. Slight improvements are to be noted in a few materials, but generally speaking the market continues dull. The temper of producers, however, is optimistic, most of them having enough business in hand to last them well into July, by which time it is expected an improvement will have taken place. There have been further recessions in the prices of several products in the past week. However, there is new strength in the coke market. Standard Connellsville grades are now selling firm at $4.65 Chicago, and Southern coke at from 25 to 50 cents a ton less. There is little fuel on track, and the bulk of that coming forward is generally sold before its arrival here. A fairly brisk demand also exists for pig iron, including some inquiries for 1,000 and 1,500 tons. While none of these orders has been placed, they have stirred the waning sentiment that was leading producers to the $9 basis, and the downward tendency has been temporarily arrested. Reports, however, are current that less than $9.25 Birmingham has been made on No. 2. Demand for bar iron has dropped off to some extent, and the business coming forward is limited to small lots. Local producers are holding the market at from 1.35c to 1.40c, according to the size of the order, though reports are current that the 7,400 tons bought during the past month by the Western Car & Foundry Co. was taken at prices considerably less than these figures. Some inquiry is felt for forging billets, on which outside mills are bidding less than pool prices. Plates are quiet and said to be selling on the basis of 1.75c Chicago. Structural steel shows increased movement, though the week's business is made up of small specifications. Spikes and bolts, while lower in price, have been in brisk demand, which is also true of light rails. The scrap market is without life, and our prices have been revised. Five railroads are in the market this week with lists aggregating 7,000 tons. A feature of the local situation is the relatively high prices railroads have been getting for their output, showing that the speculative feature has been revived. Most of the material sold by railroads in the last few months has been taken by dealers, who are holding it in stock in anticipation of higher prices when the upward movement comes. Sheets, merchant steel, pipes and tubes, and wire products are holding their own, and prices are without material change.

Pig Iron.—A few good sized inquiries have come forward during the week under review, which is about the only change to be noted in the local situation. None of these has been let as yet, and it is doubtful if they will be placed for several weeks to come, producers believing that they were only sent out to test the market. Little iron has been bought for delivery after July 1, and reports of salesmen calling on the trade show that the condition of melters is one of attenuated stocks. With this condition confronting them, leading producers are not inclined to consider any offers at less than $9.25 Birmingham for No. 2, believing that the lack of orders for iron is not so much a question of price as it is of scant demand for castings. Rumors are current here that $9 Birmingham has been made on No. 2, but though heard frequently, they cannot be traced to any reliable source. Most of the furnaces are comfortably filled for June and some for longer periods, and in view of the existing conditions prefer to let the market drag rather than try to force sales at present prices. Northern iron is firm at $13.50 Chicago for No. 2, local producers stating they will either get this price or bank their fires. This is a firm market at the quotations current, and though present needs of melters are generally expressed in carload orders, there is no disposition on the part of sellers to shade their schedules. We quote as follows:

Lake Superior Charcoal	$14 50 to 15 00
Northern Coke Foundry No. 1	14 00 to 14 25
Northern Coke Foundry No. 2	13 50 to 13 75
Northern Coke Foundry No. 3	13 25 to 13 50
Northern Scotch Foundry No. 1	14 25 to 14 50
Ohio Strong Softeners No. 1	15 30 to 15 80
Ohio Strong Softeners No. 2	14 80 to 15 30
Southern Coke Foundry No. 1	13 40 to 13 65
Southern Coke Foundry No. 2	12 90 to 13 15
Southern Coke Foundry No. 3	12 40 to 12 65
Southern Coke Foundry No. 4	12 15 to 12 40
Southern No. 1 Soft	13 40 to 13 65
Southern No. 2 Soft	12 90 to 13 15
Southern Gray Forge	12 15 to 12 40
Southern Mottled	12 15 to 12 40
Southern Silveries (4% to 6% Silicon)	14 85 to 15 85
Jackson Co. Silveries (8% to 10% Silicon)	17 80 to 18 30
Alabama and Georgia Car Wheel	18 85 to 19 35
Malleable Bessemer	14 00 to 14 50
Alabama Basic	13 15 to 13 40
Virginia Basic	14 40 to 14 65

Iron and Steel Bars.—A limited tonnage of both products has been placed with mills in the past week, though the specifications against old contracts are all that can be desired. It develops that the total tonnage of bar iron bought by the local car builder within the past month amounted to 7,400 tons, 5,000 tons of which went to an Indiana mill and the balance to a producer in Cuyahoga Falls, O. It is not definitely known at what price this iron was closed at, though reports place it from 1.20c to 1.25c at the mill. On small lots, mills are asking from 1.35c to 1.40c, half extras, according to the size of order and delivery required. A large local producer outside the association is cutting the price of soft steel bars $1 a ton. We quote current prices in this market, carload lots,

mill shipments, as follows: Bar iron, 1.35c to 1.40c, base, half extras; soft steel bars, 1.46½c to 1.51½c, half extras; soft steel angles, less than 3 x 3, 1.51½c to 1.56½c; hoops, 1.56½c. On lots from store, we quote as follows: Iron bars, 1.75c base, full extras; steel bars, 1.70c to 1.80c, base, half extras; hoops, 2c to 2.10c rates, full extras.

Billets.—While the association schedule is being upheld in this market by parties to the agreement, two or three outside manufacturers are offering both rolling and forging billets at less than these prices and booking some business at same. The tonnage, however, is small and restricted to forging billets. We continue to quote pool prices for Bessemer and open-hearth billets, 4 x 4 and larger, up to .25 carbon, $24; up to and including .60 carbon, $1 extra; over .60 carbon, $2 extra. Billets, 3⅞ inches and smaller and sheet and tin bars, $25. Open-hearth billets from store, $1.30 per 100 lbs.

Sheets.—Some nice business has come forward during the past week, and a fair tonnage has been placed with mills. Prices are still an uncertain quantity and the following schedule is not generally lived up to. The desirability of the order determines in a larger measure the quotations made, and, with this reservation, we quote the following prices: For one pass, cold rolled, blue annealed sheets, mill shipments, Chicago delivery, as follows: Nos. 11-12, 1.86½c; Nos. 13-14, 1.91½c; Nos. 15-16, 2.01½c. On box annealed, one pass, cold rolled, Nos. 18-20, 2.11½c; Nos. 22-24, 2.16½c; Nos. 25-26, 2.21½c; No. 27, 2.26½c; No. 28, 2.36½c; No. 29, 2.51½c; No. 30, 2.61½. Store prices are as follows: Nos. 8-10, 2.10c; No. 12, 2.20c; No. 14, 2.25c; No. 16, 2.30c; Nos. 18 and 20, 2.40c; Nos. 20-24, 2.45c; No. 26, 2.55c; No. 27, 2.65c; No. 28, 2.85c; No. 29, 2.95c; No. 30, 3.10c. On galvanized sheets producers are quoting 80 and 2½ to 80 and 10 percent discount at mill, carload lots; while jobbers' prices on the same product range from 75 and 7½ to 75 and 10 percent discount.

Structural Steel.—Mills report a better demand from structural yards, as well as a fair amount of business from railroads and car builders. The specifications, however, are all of small tonnages, for which prompt shipment is asked. Prices are firm, and we quote Chicago delivery, mill shipments, as follows: Beams and channels, 16 inches and under, 1.76½c; 18 inches and over, 1.86½c; universal plates, 1.76½c; angles, 3 x 3 and larger, 1.81½c; zees, 1.76½c. On lots from store, we quote beams, channels and angles, 3 x 3 and larger, 2c; 18, 20 and 24-inch, 10c extra; tees, 2.05c rates.

Plates.—While the new business being placed is not large, it is of proportions great enough to keep the local plate mill in operation. Outside mills are taking orders on the basis of 1.75c Chicago, and some at lesser figures. We quote association prices, car lots, mill shipments, Chicago delivery: Tank steel, ¼-inch and heavier, 1.76½c; flange steel, 1.86½c; marine, 1.96½c; universal mill plate, 1.76½c to 1.81½c; 3-16-inch, 1.86½c; Nos. 7 and 8, 1.91½c; No. 9, 2.01½c; No. 10, 1.91½c; No. 11, 1.96½c; No. 12, 2.01½c. From store, we quote tank steel, ¼-inch and heavier, 2c; 3-16, 2.15c; No. 8, 2.20c; No. 10, 2.25c; flange steel, 2.25c to 2.35c, all f. o. b. warehouse.

Rails and Track Supplies.—Specifications for track supplies have been heavy in the past week, and there has also been a good demand for light rails. Prices of the former have been reduced $1 a ton. We quote heavy sections, mill shipments, 500 tons and over, $28; less than 500 tons to carload lots, $30; less than carload lots, $32; second quality rails, $27; light rails, $23 to $25; track supplies, f. o. b. Joliet mill; angle bars, 1.35c to 1.45c; spikes, first quality, 1.65c to 1.75c; track bolts, 3½ x ¾, with square nuts, 2.20c to 2.30c per 100 pounds; with hexagon nuts, 2.35c to 2.45c, with differentials for other sizes.

Merchant Steel.—The agricultural trade is buying lightly at the present time, though several implement makers are sounding the market for future needs. Prices are firm, and we quote carload lots, mill shipments, Chicago delivery, as follows: Spring steel, 2c; sleigh shoe, flat sizes, 1.56½c; concave and convex, 1.76½c; cutter shoe, 2.25c; smooth finished machinery steel, 1.76½c base; smooth finished tire, 1.71½c; plow steel, 2.30c and upward, according to quality; toe calk, 2.06½c base. Ordinary grades of crucible tool steel, 6½ to 8c; special tool steel, 12c and up. Cold rolled shafting, 52 percent from list in carload lots, and 47 percent discount in less than carload lots.

Cast Iron Pipe.—New business is confined to the daily routine of small orders. Prices are without change, and we quote 4-inch water pipe, $26; 6 to 12 inches, $25; larger sizes, $24.50; gas pipe, $1 a ton higher.

Merchant Pipe.—The market is without material change. The demand is from fair to middling, and that is the best which can be said of it. We quote carload lots, mill shipments, random lengths, f. o. b. Chicago, as follows:

MERCHANT PIPE.

	Steel Pipe. Black. Percent.	Steel Pipe. Galv. Percent.	Guaranteed Wrought Iron Pipe. Black. Percent.	Guaranteed Wrought Iron Pipe. Galv. Percent.
⅛ to ⅜ inch	67.35	57.35	64.35	54.35
½ inch	70.35	60.35	67.35	57.35
¾ to 6 inches	74.35	64.35	71.35	61.35
7 to 12 inches	69.35	59.35	66.35	56.35

Less than carloads, 12½ percent advance.

Boiler Tubes.—No change is to be noted in the situation. Demand for tubes is nominally good. We quote prices of carload lots, mill shipments, as follows:

BOILER TUBES.

	L. W. Steel. Percent.	C. C. Iron. Percent.	Seamless Steel. Percent.
1 to 1½ inch	43.35	40.35	52.35
1¾ to 2¼ inch	55.35	38.85	40.35
2½ inch	58.35	43.35	43.35
2¾ inch to 5 inch	64.85	50.85	Up to 4 inches.
6 to 13 inch	55.85	88.35	50.85

Foundry Coke.—The local market is much stronger. usually the dull season with producers of wire products, mills report that their business has shown little diminution. Both the agricultural and manufacturing trades are taking material very freely, practically the entire output of producers going into immediate consumption. Prices are firm and no changes are reported. We quote to jobbers, carload lots, Chicago delivery, as follows: Wire nails, carload lots, $2.10; less than carload lots, $2.15; cut nails, carload lots, 1.91½c base; less than carload lots, 1.96½c; smooth wire, carload, $2, and $2.05 for less than carload lots; galvanized smooth wire, $2.30 in carloads, and $2.35 in lesser amounts; painted barb wire, $2.40 carloads, and $2.45 in less than car load lots; galvanized barb wire, $2.70 carloads, and $2.75 less than carload lots. Staples, polished, carloads, $2.25; less than carload lots, $2.30; galvanized, $2.55 carloads and $2.60 less than carload lots. Bale ties, 82½ and 5 percent discount, f. o. b. Waukegan, Ill., on straight carload lots. Poultry netting, 85 and 5 percent discount from list f. o. b. Joliet or De Kalb, with actual freight allowed not exceeding 50 cents per 100 pounds.

Wire Products.—Although this period of the year is Demand is not yet very heavy, though for what call there is, sellers are getting good prices. Standard 72-hour Connellsville is quoted $2 at the ovens, or $4.65 Chicago, while Southern grades of coke can be had from 1.75c to $2 at the ovens.

Old Material.—One of the peculiar conditions of the local market is, that in the face of almost no demand from consumers of scrap, the large producers of old material—the railroads—find no difficulty whatever in disposing of their scrap at prices which must be considered good in view of the weakness in other branches of the metal markets. Nearly every week for the last two or three months one or more railroads has had lists out of varying amounts, which have either been purchased by dealers or disposed of to mills on conversion deals. This week there are five lists out aggregating 7,000 tons, divided as follows: C. M. & St. P., 2,000 tons; C. R. I & P., 1,000 tons; A. T. & S. F., 2,500 tons. It is very difficult, in view of the conditions existing, to correctly report values of scrap, as the prices of no two dealers agree. Some are speculating on the market and buying up all the material they can carry, while the sales to consumers are generally of a forced character and at a price to suit the conditions existing in the yards of either the seller or buyer. A careful canvass of the local consumers and dealers shows the following selling prices to be a fair average in this market. On gross tons:

Old iron rails	$14 50 to 15 00
Old steel rails (4 feet and over)	11 00 to 11 50
Old steel rails (less than 4 feet)	9 50 to 10 00
Relaying rails, subject to inspection	23 00 to 24 00
Relaying rails for sidetracks	18 00 to 20 00
Old wheels	11 50 to 12 00
Heavy melting steel	9 50 to 10 00
Mixed country steel	7 00 to 7 50

The following quotations are for net tons:

Low phosphorus scrap (.04 and under)	12 00 to 13 00
No. 1 R. R. wrought	10 50 to 11 00
No. 2 R. R. wrought	9 00 to 9 50
Shafting	12 50 to 13 00

Dealers' Forge, No. 1	8 00 to 8 50
Wrought pipe and flues	7 50 to 8 00
No. 1 R. R. cast	8 25 to 8 75
Agricultural and machinery cast	8 75 to 9 25
Heavy cast	7 75 to 8 25
No. 1 mill	6 00 to 6 50
Country sheet	5 00 to 5 50
No. 1 boilers, cut	7 50 to 8 00
Boiler punchings	9 50 to 10 00
Iron car axles	15 00 to 15 50
Steel car axles	13 50 to 14 00
Iron axle turnings	7 00 to 7 50
Steel axle turnings	7 00 to 7 50
Cast borings	3 00 to 3 50
Mixed borings, etc.	3 00 to 3 50
Wrought turnings	6 00 to 6 50
Machine shop turnings	6 00 to 6 50
Railroad malleable	8 25 to 8 75
Agricultural malleable	7 75 to 8 00
Stove plate and light cast scrap	7 50 to 8 00
Old iron splice bars	12 00 to 12 50

CLEVELAND.

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, June 8.

Although some very low prices have been made on pig iron within a few days and, in spite of the fact that the demand for finished material is not strong, the market is not entirely without encouraging features, the principal one being that specifications are coming in satisfactorily. Manufacturers report that, while there is little heavy ordering, small orders aggregate quite large amounts.

Iron Ore.—The strike of the Masters' and Pilots' Association promises to end with a complete victory for the Lake Carriers' Association. Captains and mates in large numbers are resigning from the union and are asking for their old positions more rapidly than the owners can send the vessels out. The outlook is that before the close of the week all boats having cargoes contracted for will be afloat. Up to June 1 last year 4,521,576 tons of iron ore had been shipped from the northern ports against none this year. After June 15, there were 17,327,974 tons shipped and vessel owners are now predicting that 17,000,000 will be about the tonnage for this season; or, in other words, that about as much ore will be shipped after June 15, this year, as in the same period of 1903. Hence, they say, the freight rate should be the same, based on 85 cents from the head of the lakes, the contract price of last year. It is, however, very doubtful if anything like 17,000,000 tons will be shipped this season and shippers do not concede that the 85 cent basis will prevail.

Very few sales of ore have been made during the past week. Ohio and Pennsylvania furnaces in order to make up their mixtures, are borrowing from each other and are having no trouble in keeping in blast without placing orders for ore. The ore on Lake Erie docks is not being forwarded very rapidly.

Pig Iron.—A furnace company which named $12 at its Valley plant for No. 2 failed to get the order, the buyer saying that he had quotations both below and above $12. The usual Valley quotation is very near $12, although some interests which have disposed of most of their product for the first half of the year are not quoting so low. A pipe company placed a large order for about $8.25, Birmingham, for No. 3 and No. 4 iron. Some Southern furnaces are holding for $9.25, Birmingham, for No. 2, but others are selling at $9. Almost no Southern foundry iron is being sold in Cleveland. We quote for Cleveland delivery, except gray forge, which is at Valley furnace, as follows:

Bessemer	$13 00 to 13 10
No. 1 Strong Foundry	13 25 to 13 50
No. 2 Strong Foundry	12 85 to 13 00
No. 3 Foundry	12 50 to 12 75
No. 2 Southern	12 85 to 13 10
Gray Forge, Valley furnace	11 75 to 12 00
Gray Forge, Southern (Cleveland)	11 85 to 12 00
Lake Superior charcoal	14 25 to 14 50

Finished Material.—Mills report a better demand, especially for structural material. Specifications are coming in freely. The understanding among the principal producers of bar iron that 1.35c Pittsburg is the price to be maintained when possible still exists, but lower prices are constantly named to meet the competition of the smaller mills. Exaggerated reports in regard to the closing of mills have recently been published by newspapers. The truth is that the bar iron mills will close for a time this summer, as they always do, and it is probable that in certain cases the period of inactivity will be longer than usual—some mills may be idle through July and August—but there is no special significance in this plan. Owing to a typographical error in this column last week, 1.30c Pittsburg was given as the price of steel bars. There has been no change in the price, which is 1.35c, Pittsburg, or 1.44½c, Cleveland for Bessemer, and 1.40c Pittsburg or 1.49½ Cleveland for open-hearth. Sheets are selling at from $1 to $2 per ton lower by the principal producers. Some of the independents are giving very poor delivery. We revise quotations as follows, Cleveland delivery, the freight from Pittsburg being 9½ cents: Mill sales of black sheets in carload lots, No. 10, 1.74½c; No. 11-12, 1.79½c; No. 14, 1.84½c; No. 16, 1.94½c; No. 27, 2.19½c; No. 28, 2.29½c. Galvanized, mill sales: No. 14, 2.29½c; No. 16, 2.39½c; No. 18-20, 2.54½c; No. 22-24, 2.69½c; No. 25-26, 2.89½c; No. 27, 3.09½c; No. 28, 3.29½c. Out of stock, galvanized sheets, are quoted 75, 10 and 5 off for Nos. 16 to 20 and 75, 10 and 7½ off for No. 22 and lighter gauges.

Old Material.—Dealers are almost the only buyers. Very low prices prevail and dealers find it difficult to dispose of any scrap. Some are buying on speculation, expecting to hold it for some time. Iron rails have been bought as low as $14 by dealers. We revise quotations as follows:

Old iron rails	$14 00 to 15 00
Old steel rails (over 6 feet)	12 00 to 13 00
Old steel rails (under 6 feet)	11 00 to 12 00
Old car wheels	10 00 to 11 00
Steel boiler plate	9 00 to 10 00
Malleable iron (railroad)	9 00 to 10 00
Malleable iron (agricultural)	8 00 to 9 00
Heavy steel	10 00 to 11 00

We quote the following net tons:

No. 1 R. R. wrought	$10 00 to 11 00
No. 1 busheling	9 00 to 9 50
No. 1 machine cast	9 50 to 10 50
Iron axles	15 00 to 16 00
Axle turnings	7 00 to 8 00
Wrought turnings (free from cast)	6 00 to 6 50
Grate bars	7 00 to 8 00
Pipes and flues	8 00 to 8 50
Tank iron	7 50 to 8 50
Hoop and band iron	5 00 to 5 50
Sheet iron	4 00 to 5 00
Wrought drillings	6 00 to 6 50
Stove plate	7 50 to 8 50
Steel axles	13 00 to 14 00
Cast borings	4 00 to 4 50

CINCINNATI.

June 7.

The coke market continues quiet and easy. The best brands of Connellsville coke are quoted generally at $2 to $2.15 f. o. b. ovens, but there are some brands available at lower prices. The demand is light, and the market dull.

Pig Iron.—The most notable transaction of the week has been a sale of 12,000 tons to an Ohio pipe maker by analysis. The price is regarded as about equal to $8.25 Birmingham for No. 4 foundry. The Ohio stove manufacturer has not yet placed his order on the 2,500 ton inquiry which has been pending for two weeks. It is reported here today that the leading interest in harvesting machinery was in the market for from 25,000 to 30,000 tons for deliveries extending from July to April. The inquiry called for 6,000 tons for delivery at Springfield, O., and the balance for delivery at the larger plants of the company. The purchase is to be made by analysis. The general situation has changed but little during the week and the rank and file of buyers still show little disposition to come into the market or to inquire for third quarter iron. A few small sales of No. 3 foundry have been made at $8.50 Birmingham. While an occasional small transaction, which is almost the extent of the business going, is booked at $9.25 for No. 2, there is hardly any one in the trade that would expect to take any large sized order at over $9 Birmingham for No. 2 foundry. In Ohio irons the market is regarded as weak at $12 for No. 2 foundry at the furnace, still we do not hear of transactions under this price. There is a feeling among some of the interests that Southern furnaces will be disinclined to take third quarter tonnage on their books at today's prices. It is argued that with impending labor difficulties in the Birmingham district the furnaces would rather blow out than operate under strike conditions and unremunerative prices. On the other hand, there are those who believe that the Southern interests will follow

the market, as they have done in the past. The following are current prices f. o. b. Cincinnati:

Southern Foundry No. 1	$12 25 to 12 50
Southern Foundry No. 2	11 75 to 12 00
Southern Foundry No. 3	11 25 to 11 50
Southern Foundry No. 4	11 00 to 11 25
Southern Foundry No. 1 soft	12 25 to 12 50
Southern Foundry No. 2 soft	11 75 to 12 00
Gray Forge	10 75 to 11 00
Northern Foundry No. 1	13 65 to 13 90
Northern Foundry No. 2	13 15 to 13 40
Southern car wheel iron	16 25 to 16 50

Finished Material.—Aside from an advance of $3 per ton in hoops and bands there is no change in the market. The demand continues light and trade quiet. Bar iron is easy at 1.40c f. o. b. Steel bars, 1.48c base, half extras, with dealers quoting 1.75c to 1.90c for iron and steel out of store. Galvanized sheets are being quoted at 75 and 10 to 75, 5 and 2½ percent off. We quote black sheets, No. 27, at 2.30c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 2.70c; No. 27, 2.60c; No. 16, 2.35c; No. 14, 2.25c; No. 12, 2.10c; No. 10, 2.05c. Tank plates are dull and sell out of store at 2c for ¼-inch and 2.10c for 3-16-inch. Beams and channels are quoted at 2c from stock and angles at 1.90c to 2c for base sizes.

In merchant pipe there is nothing new to report. Business is quiet and independent mills are believed to be carrying fairly good stocks which gives the market an easy undertone in view of the hand to mouth character of the demand. Car lots are quoted as follows, f. o. b. Cincinnati:

MERCHANT PIPE.

(Basing Discounts.)

	Steel Pipe. Black. Percent.	Steel Pipe. Galv. Percent.	Guaranteed Wrought Iron Pipe. Black. Percent.	Guaranteed Wrought Iron Pipe. Galv. Percent.
⅛, ¼, ⅜ inch	67.7	57.7	64.7	54.7
½ inch	70.7	60.7	67.7	57.7
¾ to 6 inch, inclusive	74.7	64.7	71.7	61.7
7 to 12 inch, inclusive	69.7	59.7	66.7	56.7

BOILER TUBES.

	Steel Percent.	Iron Percent.
1 to 1½ inch	41.2	27.7
1¾ to 2¼ inch	54.2	36.7
2½ inch	56.7	41.7
2¾ to 5 inch	63.2	49.2
6 to 13 inch	54.2	36.7

Old Material.—The demand continues light and the market dull and easy. An easy tone prevails at the following quotations. We quote:

Old No. 1 railroad wrought, net tons	$10 00 to 10 50
Cast machine and foundry, net tons	9 50 to 10 00
Old iron rails, gross tons	12 50 to 13 00
Old steel rails, gross tons	10 00 to 10 50
Old short lengths, gross tons	10 50 to 11 00
Old iron axles, net tons	14 50 to 15 00
Stove plate, net tons	7 50 to 8 00
Wrought turnings, net tons	7 00 to 7 50
Cast borings, net tons	4 00 to 5 00

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1315, NO. 150 NASSAU ST., June 7.

Pig Iron.—Sales continue to represent a small tonnage in the aggregate. Buying in small lots seems to be such a favorite method with consumers that a 50-ton order is made much of. In Southern irons it can be positively stated that the $9 Birmingham basis for No. 2 foundry has been reached. Sales at this figure foot up nearly 1,000 tons, one lot of 500 tons being included. One interest is still quoting for $9.50, while other companies are glad to get $9.25. Sellers doubt if it makes much difference what the price of iron is, because there is so little demand for it. There are several inquiries in the market covering deliveries for the remainder of the year. One of these is for 1,500 tons, and we know that a Southern company refused to take the order at $9.50 Birmingham for No. 2 foundry, believing that prices will have touched their lowest level during the summer months. In Northern irons business is at a low ebb, and prices are from 25 to 50 cents lower than those which prevailed a fortnight ago. Altogether the situation is a quiet one, with buyers waiting for the market to settle before providing for future requirements on any large scale. Pig iron warrants, on the basis of No. 2 Southern foundry, are offering at $9 with no buyers. New York prices at tidewater follow: Northern No. 1 X, $14.75 to $15.25; No. 2 X, $14.25 to $14.75; No. 2 plain, $13.75 to $14.25; Southern No. 1 foundry, $13.25 to $13.75; No. 2 foundry, $12.75 to $13.25; No. 3 foundry, $12.25 to $12.75; No. 4 foundry, $11.75 to $12.25.

Rails.—No sales of any consequence are reported, trade in small lots being the rule. Published reports that Canadian interests will soon be in the market with substantial specifications, are not taken seriously here. Standard sections remain $28 at mill.

Finished Iron and Steel.—The opening week in June finds trade in structural shapes showing but little animation, and mill representatives resigned to the belief that no improvement can be expected for some weeks. Orders being placed nowadays make up a very light tonnage, and are for "dribs and drabs," to use the words of one seller. The sheet market is dead, jobbers saying they have booked fewer orders in the last two weeks than for a similar period in several years. Prices are again a shade lower. In bars new business is light, with prices stationary. Plate mills continue to complain of existing conditions, and there are rumors that price schedules are not being strictly adhered to. New York prices are as follows: Beams and channels, 15 inches and under, 1.75c to 1.90c; angles, 3 to 6 inches, 1.75c to 1.90c; zees, 1.75c to 1.90c; bulb angles, 2.05c to 2.35c; deck beams, 2.05c to 2.35c; sheared steel plates, tank, 1.74½c to 1.80c; flange, 1.84½c to 1.90c; firebox, ordinary, 1.94½c to 2c; refined iron and soft steel bars, 1.49½c; sheets, in car load lots, New York, No. 28 black, 2.35c to 2.40c; galvanized, 3.40c to 3.45c.

Old Material.—Outside of some fairly good sales of light steel scrap, the market has been a listless one, with prices as a general rule receding. Offerings from first hands are heavy, but dealers demand and are accorded substantial reductions from first figures. Sales per gross ton for this city and immediate vicinity might be made as follows.:

Old iron rails	$13 75 to 14 25
Old steel rails, long lengths	11 80 to 12 25
Old steel rails, short pieces	10 00 to 10 50
Relaying rails	17 00 to 18 00
Old car wheels	11 00 to 11 50
Old iron car axles	15 50 to 16 00
Old steel car axles	14 00 to 14 50
Heavy melting steel scrap	10 00 to 10 50
No. 1 railroad wrought scrap	11 50 to 12 00
Iron track scrap	10 50 to 11 00
Wrought pipe	8 00 to 8 50
Ordinary light iron	6 50 to 7 00
Cast borings	3 50 to 4 00
Wrought turnings	5 50 to 6 00
No. 1 machinery cast	10 00 to 11 00
Stove plate	8 00 to 8 50

PHILADELPHIA.

June 7.

Excepting inquiries for considerable pig iron, there are almost no signs of activity in the market, and dullness is more pronounced than for several years. Production is being curtailed and this may prevent the downward tendency of prices from continuing. There is a very strong sentiment among manufacturers in favor of closing their plants rather than operate at or below cost.

Pig Iron.—Owing to the sharp reduction of output, lower prices are not expected, but buyers are very cautious. Although inquiries are numerous, sales are few. Buyers seem willing to pay $14.50 delivered for No. 2 X foundry, but sellers are not willing to make that price. We quote as follows: No. 1 X foundry, $15.25 to $15.50; No. 2 X foundry, $14.75 to $15.00; No. 2 plain, $14.25 to $14.50; Alabama No. 2, rail shipment, $13.75 to $14; Alabama No. 2, on dock, $13 to $13.25; Standard Gray Forge, $13.50 to $13.75; Ordinary Gray Forge, $12.75 to $13; Basic, $13.75 to $14.

Finished Material.—The market is extremely dull. Prices are not changed officially, but there are persistent rumors of concessions being made. We quote as follows: Beams, channels and angles, 1.73½c to 1.85c, according to the specifications, and small angles, 1.50c to 1.55c. Bars, both iron and steel, 1.48½c to 1.55c; skelp, 1.45c to 1.50c, seller's mill for grooved and a tenth more for sheared.

Old Material.—The market is very dull and prices are lower. Buyers show no interest. We quote: No. 1 steel scrap, $12 to $12.50; low Phos. scrap, $16 to $17; old steel axles, $15 to $16; old iron axles, $17 to $18; old iron rails,

$15 to $15.50; old car wheels, $12 to $12.50; choice R. R. No. 1 wrought, $13.50 to $14; machinery cast, $12.50 to $13; No. 2 light scrap (forge), $10.50 to $11; No. 2 light scrap (ordinary), $9 to $10; axle turnings, $9.50 to $10; wrought turnings, $9.25 to $9.75; cast borings, $6.50 to $6.75; stove plate, $9 to $9.50; wrought iron pipe, $10 to $11.

BIRMINGHAM, ALA.

BIRMINGHAM, Ala., June 6.—The dullness in the pig iron market noted during the past three or four weeks still prevails. Prices are about the same as they were last week, No. 2 foundry being quoted at $9.25 per ton, with rumors of sales at $9 per ton. A recent inspection of the iron sales books of two of the larger corporations in the district for the purpose of determining the mining wage for the month showed that the average was under $8.90 per ton, all grades sold last month being taken into consideration. The miners in accordance with contract stood a reduction in their wage scale and the minimum mining price is now paid, 47½ cents per ton.

Shipments are not as active as they might be. There is likely to be some accumulation noticed in the near future, the production in the Southern territory being exceptionally good. The Sloss-Sheffield Steel & Iron Co. with six furnaces in operation in May manufactured more iron than ever before in one month, 36,418 tons.

There are still no indications in the South that there will be a concerted movement looking to curtailment of the iron production. All the furnaces in operation are doing well, their outputs being above the average.

It is officially stated that the steel plant of the Alabama Steel & Wire Co. at Gadsden will be ready for operation before the end of the present month. The new furnace of the Lookout Mountain Iron Co., located at Battelle, on the Queen & Crescent route, between Birmingham and Chattanooga, will be completed also about the end of this month or shortly after July 1. President Battelle and other officers and directors have been about the properties of the company watching the progress made. Coal mines, coke ovens and ore mines belonging to the Lookout Mountain Iron Co. are in operation already, the coke being sold to other companies.

The cast iron pipe industry is in the best shape of the entire kindred hereabouts. The foundries turning out cast iron pipe are working steadily and the shipments are healthy.

In finished iron the situation hereabouts is not so bright. The Gate City rolling mills (Republic company) have been in operation steadily, but the other plants have been idle. In this line all eyes are now turned to the conference this week at Cambridge Springs, Pa., between the Amalgamated Association and the Republic Iron & Steel Co. on the new scale for bar iron.

On Saturday last a conference was held in Birmingham between the Tennessee Coal, Iron & Railroad Co., Republic Iron & Steel Co. and Sloss-Sheffield Steel & Iron Co., at which the report of the experts appointed to investigate the values of coal and ore properties of the three companies was submitted. In attendance were President A. W. Thompson, Vice President and Treasurer J. F. Taylor and Southern Manager W. H. Hassinger, of the Republic company, President J. C. Maben of the Sloss-Sheffield company and President Don H. Bacon of the Tennessee company. It was decided not to give out any information contained in the report of the experts. In its entirety it will be submitted to a meeting of the three companies to be held in New York June 14 or 15. The original plan for securing the report of experts on values of coal and ore properties looked to a merger of the three companies. There is no idea of the original plans being carried out, though there is no telling what may develop at the meeting to be held in New York next week. Some of the officials of the three companies say there is no possible chance for the deal to be consummated. It is understood that the report of the experts is a little disappointing in that it does not touch on anything but developed property, while some of the companies have more property undeveloped than being worked.

The Metal Market.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1315, No. 150 NASSAU ST., June 7.

Pig Tin.—The past week has brought about a decidedly weak market, our quotations at today's close being the lowest which have been reached this year. London operators who have been supporting the market, finding that the demand here is constantly decreasing, are now leaving the metal taking its course. The situation here is very dull, and no improvement for the summer is expected. Today's closings at the Metal Exchange follow: Spot, 26⅝ to 26⅞c; June, 26½ to 26⅞cc. London's closings today follow: Spot, £121 10s; futures, £121 2s 6d.

Arrivals amount to 975 tons, with 2,340 tons afloat.

Copper.—Business is practically at a standstill, and the "official" prices have again been reduced ⅛c, with the probabilities that buying on the outside market can be done at ⅛c less. There is absolutely nothing in the trade situation upon which a cheerful report could be based. In London the market has been without interest and prices show no change from a week ago. Today's closings at the Metal Exchange follows: Lake, 12¾ to 13c; electrolytic, 12⅝ to 12⅞c; casting, 12⅜ to 12½c. London's closings today follow: Spot and futures exports amounted to 2,449 tons.

Lead.—There has been a further decline in spot, which is now quoted at 4.25 to 4.35c. St. Louis is weaker at 4⅛c. London is steady at £11 15s.

Spelter.—Is weaker under freer offerings, sales of spot being made at 4¾ to 4⅞c, and June at 4.70 to 4.80c. St. Louis is slightly lower at 4⅝c. London declined to £21 17s 6d.

Antimony.—Cookson's is offering at 7¼c, Hallett's at 7.00c to 7¼c, and other brands at 6½c to 6⅝c.

Quicksilver.—We quote $45 per flask of 76½ pounds in lots of 100 flasks. London is £8.

Nickel.—Sales are made at 40c to 47c for large lots down to a ton, and at 50c to 60c for smaller quantities.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1164 MONADNOCK BLOCK, June 7.

There is little demand for metals in this market. Pig tin, spelter and lead have declined in value, and copper is also weak. Lake is quoted 13¼c for carloads, and 13⅝c for less than carload lots; casting, 12⅞c for carloads and 13⅛c for smaller quantities. Pig tin is unchanged at 28c to 28½c, according to quantity. Spelter, 4.90c to 5c in car lots, and 5½c to 5¾c in lesser lots. Sheet zinc, 6.20c, car lots of 600 lb. casks, and 6.45c to 6.50c in less than car lots. Pig lead, 4.30c in carloads, and 4.35c to 4.60c in lesser amounts.

Demand is weak and prices of a declining tendency. We quote as follows: Copper wire and heavy, 11c; copper bottoms, 9¾c; copper clips, 11c; red brass, 9⅝c; yellow brass (heavy), 7½c; yellow brass borings, 6c; red brass borings, 7⅝c; light brass, 5⅜c; pipe lead, 3.60c; tea lead, 3¼c.

Members of the British Institution of Mechanical Engineers will visit Cincinnati on June 10 and 11. Thomas P. Eagan is chairman of the committee on entertainment. The program includes trips to various industrial establishments and to several other places of interest, concluding with a dinner at the Country Club.

The National-Acme Mfg. Co., of Cleveland, announces the opening of its New York office in the St. Paul building, 220 Broadway, in charge of R. A. Scranton as manager. This office will handle Eastern business in the Acme automatic multiple spindle screw machines, Acme semi-automatic screw slotters and other products of the company.

LAKE SUPERIOR IRON MINES.

A notable cargo of ore has been sent from Duluth, being 1,704 tons of Albany grade, consigned to the Dominion Iron & Steel Co., at Sydney, Cape Breton. This is the first cargo ever sent to that part of the coast and the first interior ore that the Dominion company has found it necessary to use with its own grades, though it has been an importer from other countries for some time. A considerable quantity of this Western Mesabi ore will be shipped to Sydney this year. Albany grade is guaranteed 60 iron and .077 phosphorus. This cargo was on a Welland canal ship, the Turret Cape, and gave her a draft of 13.6 feet.

Pickands, Mather & Co.'s Troy mine, at Eveleth, Mesabi range, is to be closed indefinitely and the pumps are being pulled. The mine is developed for a large production and has been stocking ore since last fall.

It is figured that stockpiles at Eveleth, where the Fayal, Spruce and Cloquet mines are located, amount to more than 1,600,000 tons.

The tax boards of Marquette county, Mich., have begun an investigation as to the various Mesabi range companies owned by J. J. Hill and the Great Northern road. These are the Lake Superior Co., Swan River Logging Co., West Missabe Land Co., Wright Land Co., Wells Land Co., Stone Land Co., Western Employees Investment Co. and Davis Land Co. Most of these are companies growing out of the purchase, some years ago, of the Mesabi interests of Messrs. Wright, Wells, Stone and Davis, of Saginaw, on the western Mesabi, chiefly in T 57 R 21, by the Great Northern road. With the exception of a little land near Hibbing these companies own nearly all the ore-bearing formation through that township. Western Employees Investment Co. is an organization formed by Mr. Hill for the benefit of some of his assistants who had most to do with the development of his business on the Mesabi range, and to which he turned over an extremely valuable mining lease. These concerns are all limited partnerships, and all have had their head offices at Marquette, in Michigan, for a year, though their entire business is carried on at St. Paul and Duluth, in Minnesota. The Marquette officials seem determined to place them on the tax rolls.

The Gogebic county, Mich., board of equalization has reduced tax valuation on the Tilden, Colby, West Colby, Palms, Verona and Jackpot by $390,000. All these mines are supposed to be rapidly growing less valuable.

Sunday Lake and Brotherton mines, of the Sellwood interest at Sunday Lake, eastern Gogebic range, have closed indefinitely. The order for closing was so unexpected and so sudden that it found and stopped 200 men of the night shifts who were in the changing house preparing to go under ground. The village of Wakefield is now dependent upon the little Castile, an exploration of Corrigan, McKinney & Co., which employs 100 men and the continuation of whose operations is a matter of question.

Operations at Blue mine, of the Regent group, Negaunee, have ceased and the mine is closed with 300 men out. Three-fourths of this property is owned by the Oliver Iron Mining Co., one-fourth by the Cleveland Cliffs Iron Co. Queen and Prince of Wales, other mines of this group, are still operating steadily, but with small forces.

Pumps have been pulled at Cundy mine, Menominee range, and the property is idle indefinitely. It is operated by the Illinois Steel Co. Cundy is a hard ore mine, of not especially high grade and rather expensive to mine.

Preparations are under way for resumption at the Helen mine of the Lake Superior Co., at Michipicoten. Chas. E. Seelye will be in charge. The mine will propably not produce much more ore this year than has been sold for shipment down the lakes. This is an especially nice ore in the furnace, though not Bessemer, and sells at a good price. It is probable that the company will carry on an extensive exploration of its property this year, and that other portions of the Michipicoten range will be examined as thoroughly as possible in the hope of finding some of the ore bodies that preliminary exploration indicated might exist. A. B. Willmott will probably again be associated with the Sault company in charge of explorations.

Upon notice that wages of stripping labor were to be cut from $1.75 to $1.60 a day the crews employed about shovels of the Drake & Stratton Co. at several Mesabi range points refused to work and the company attempted to proceed with other men, many of whom wanted employment. This brought about some shooting and five men were hurt, one of them probably fatally. The company then announced that its stripping would be discontinued for the year. This threat did not have much immediate effect. The contracts taken by this company were secured when wages were at about $2 a day and a reduction to $1.60 would mean a much larger profit to the operators. That rate of wages is not especially attractive to outdoor labor in the Northwest.

Lincoln mine, of Jones & Laughlin, Ltd., has been reopened a month and has accumulated a stockpile of nearly 75,000 tons, an indication of large production this year. The company's Lake Angeline at Ishpeming has been diminishing its force and recently let out 75 men more and their Grant will not operate at all this year, so the Lincoln and contract ores will be depended on to carry the concern through. A complete electric haulage system, both for underground and surface tramming, was put into use this week. There are two locomotives on the stockpiles and two underground. A large machine shop has been built and fitted with excellent tools of capacity for anything about the mine. A new laboratory has been built and various other improvements have been made. Two shafts are in operation, and both are extensively developed underground. Lincoln is a large mine and produces a fine grade of Bessemer ore. About 350,000 tons will be shipped this year.

Cherry Valley Iron Company.

(Special Telegram.)

Pittsburg, June 8.—The Cherry Valley Iron Co. expects to blow in its Fannie furnace at West Middlesex, Pa., some time next week. This plant has been inoperative for some time, an entirely new stack 17 x 70 feet having been erected to replace the old one. New blowing engines were installed as well as an automatic skip. Two new trestles for the dumping of the ore and coke were also built. As soon as this stack is running well the Cherry Valley stack at Leetonia, O., will go out for repairs.

Mesta Machine Company Addition.

(Special Telegram.)

Pittsburg, June 8.—The Mesta Machine Co. is having plans prepared for a large addition to its plant on the site recently vacated by the removal of the plant of the American Bridge Co. The property was purchased some time ago when the capital of the company was increased to $1,250,000, but only lately became available. Among the orders recently received is one for the entire equipment for a sugar plant in Cuba consisting of engines and sugar making machinery for the Colonial Sugar Co.

Lackawanna Steel Co.

The Lackawanna Steel Co., Buffalo, will begin on June 15, the rolling of light rails from 25 to 40 pounds. The company expects to begin shipping structural shapes by Aug. 1. It has not been announced whether the company will become a member of the structural material pool, but it is probable that it will not.

Owing to the strike of masters and pilots on the great lakes, the total tonnage to pass through the Soo canals to June 1 this year is but 449,888, while the tonnage for the month of April, 1903, was 1,651,839 tons and that for May, 1903, was 5,186,017, making a total falling off of this year, June 1, of 6,389,968. Another interesting feature of the report is that the traffic of the Canadian canal is but 47,000 tons lighter than that of the American canal. Very little iron ore has passed the Soo thus far this year, the amount being 4,625 net tons.

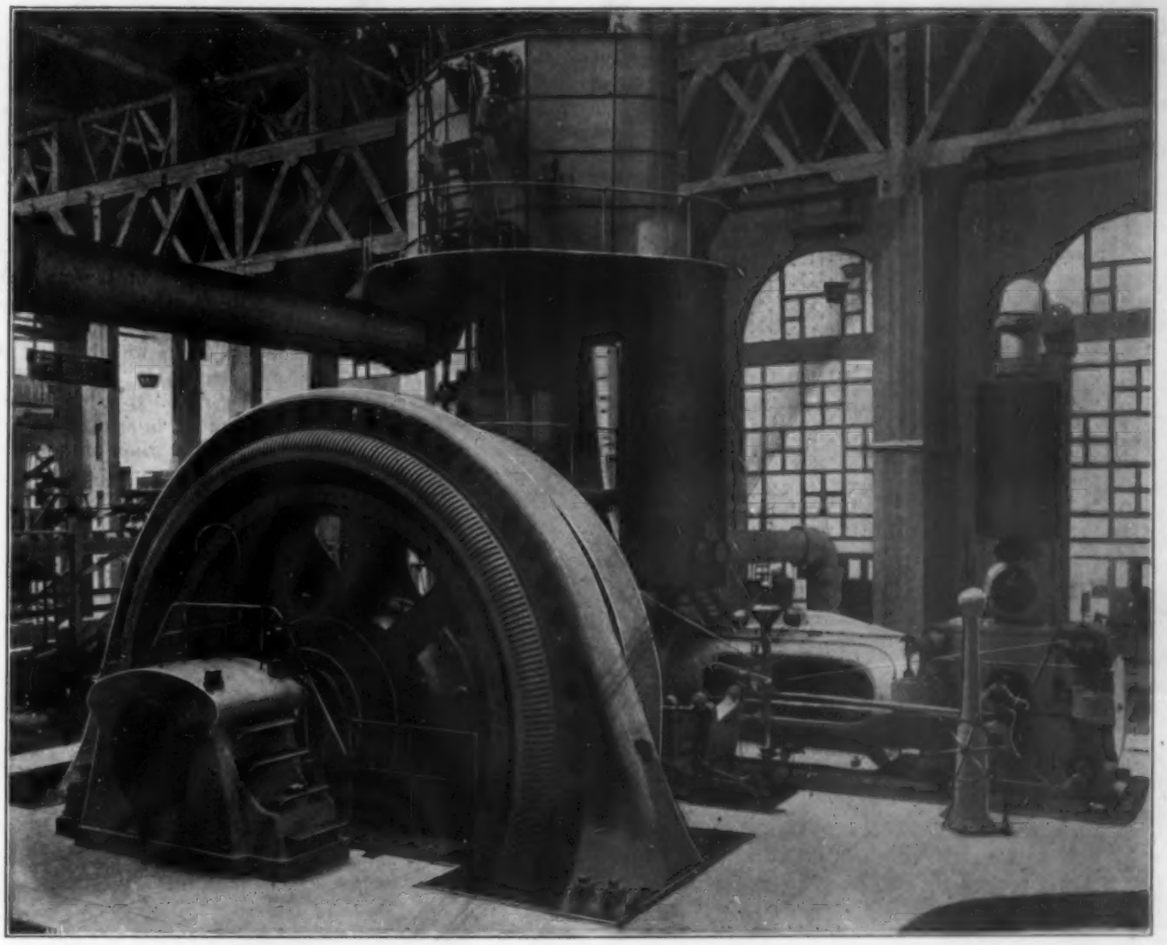
The Lennox Furnace Co., Marshalltown, Ia., recently incorporated, does not expect to build this season, but may erect a foundry after Jan. 1. It now has a plant for the manufacture of its furnaces, tin pipe and fittings and has installed considerable new machinery. It makes not only a full line of hot air furnaces, but also a special furnace for hot water.

The Universal Exposition.

(Editorial Correspondence.)

Allis-Chalmers-Bullock Machinery.

The Allis-Chalmers Co. has three large exhibits at the Louisiana Purchase Exposition, in three separate buildings, yet the scope of the company's operations is so large that several of its important lines of manufacture are still unrepresented. The great 5,000-h. p. Allis-Chalmers engine and direct connected 3,500-k. w. Bullock generator which stand in the center of Machinery hall opposite the main entrance to the north are in many respects the most noteworthy of any exhibit at the fair. Towering nearly 40 feet into the air and massive in proportion they catch the visitor's eye from every portion of the vast building. When in operation the arms of polished steel and rapidly revolving flywheel, carrying with it more than half a million pounds of metal on every revolution, have a fascination which holds people for hours.



ALLIS-CHALMERS 5,000-H. P. ENGINE AND BULLOCK 3,500-K. W. GENERATOR.

This engine and generator are not only an exhibit by the Allis-Chalmers-Bullock interests but are also a very important part of the equipment of the fair. Every evening the big engine is set to work producing current to supply the myriad of decorative lights for the exposition buildings and grounds. Its nightly load is something more than 120,000 8-candle power incandescent lamps. It is from the rheostat of this outfit that the impressive effect of gradually lighting up in unison all the lamps over the entire grounds is produced. Visitors who are at this exhibit at 7:30 p. m. can see just how this is done. It is accomplished by means of a little motor controlled by a switch at the main switchboard. This motor works the arm of the rheostat and gradually cuts out the resistance in the exciter circuit of the big generator.

The big engine stands in the center of one of the largest sized spaces in Machinery hall. In the ample spaces about it the Allis-Chalmers Co. has provided tables, settees, and chairs for visitors and stationery and other facilities for the writing of letters and telegrams. The booth intended for an office has been fitted up as a ladies' parlor and facilities are provided there for checking wraps or parcels and in other ways making visitors comfortable. Free ice water is also provided here. The big engine is operated usually in the afternoons as well as at night. Machinery hall, unlike other buildings, is kept open until 11 p. m.

The engine is the largest of its type ever built. It is capable of developing 8,000 h. p. The cylinders are 44 and 94 inches diameter, respectively, and 60 inches stroke. The height of the engine above the floor is 39 feet 2 inches. The revolving parts together weigh 514,400 pounds, the flywheel, which is 25 feet in diameter, weighing 300,000 pounds, the shaft (diameter 37 inches) 61,000 pounds, and the crank 32,000 pounds.

The acquisition of the Bullock Electric Mfg. Co. by the Allis-Chalmers Co. having enabled this concern to enter actively into the electrical business, the exhibit of electrical apparatus in the Electricity building is naturally one of interest. Here among other special machines is shown the multiple voltage, three-wire system of balancing for operating variable speed machinery. It is shown operating a model machine shop consisting of three machine tools, each of which requires a speed of its own and each requiring various speeds. One side of the exhibit appeals particularly to street car men, as it contains almost a complete line of street car appliances, including motors, controllers, rotary converters and transformers.

In the Mining and Metallurgy building a space 150 feet long is filled with Allis-Chalmers mining machinery. Even in this space only typical machines can be shown. These include ore crushers, stamps, grizzlies, hoists, tube mills, ore cars, and many other appliances for use within the mine, at the pit's mouth or in the recovery plants. Near this exhibit, in the space allotted to Utah, is a complete working model of

a concentrating plant which was built by the Allis-Chalmers Co. and furnished to this exhibit. There is much other Allis-Chalmers machinery about the fair or connected with its operation. The German Tyrolean Alps gets its power to operate its lights, its railway and other atractions from Allis-Chalmers-Bullock machinery. Many exhibits are operated by Bullock motors and the distinctive feature of the fair, the cascades, depends upon Allis-Chalmers pumping engines to feed them from the Mississippi. These same pumping engines supply all of St. Louis with water, as well as the fair, and nearly every street car in St. Louis is supplied with power by Allis-Chalmers engines.

Erie Foundry Co.'s Shear and Hammer.

The Erie Foundry Co., Erie, Pa., has an exhibit in the Machinery building, section 14, aisle G, in charge of Frederick Lowber. It consists of a standard motor-driven 126-inch guillotine shear and a standard 600-pound single frame steam hammer, which are both well known products of the above company. The Erie guillotine shears have knives ranging from 72 to 154 inches, cutting from ⅛ to ⅜ inch, and driven by motors of 5 to 15 h. p. They range in height from 92 to 121 3-16 inches. Other sizes are made as desired. The clutch is so designed that there is no knocking when thrown out of contact with the wheel. A clear way is provided back of the shear the full length of the knife. The Erie single-frame hammer, the other member of the St. Louis exhibit, is made in sizes from 250 to 2,500 pounds for the combined weights of die, ram, rod and piston, with cylinder diameters ranging from 5 to 14 inches, the total weight with anvil ranging from 5,000 to 43,000 pounds. The hammers are built so that the cylinder head can be taken off and the piston raised out of the cylinder to examine and renew rings without taking the hammer apart.

Yale & Towne Mfg. Co.

A display of more than usual interest is to be seen in block 29 of Machinery hall. The space is occupied by the Yale & Towne Mfg. Co., New York and Stamford, Conn, which has made a complete exhibit of its line of chain blocks, and showing their adaptation to hand cranes. The floor space occupied is 40 x 27 feet. The blocks are mounted on a frame of structural steel 30 feet above the floor line, compactly arranged for observation. The three types of Yale & Towne chain blocks—differential, duplex and triplex—are shown in sizes that range from 250 pounds to 20 tons capacity.

The chief feature is the illustration of "half a minute's work." This shows the three types of differential, screw and spur-geared blocks. Each block is driven by a small motor and an ammeter shows the consumption of current. Each block lifts 1,000 pounds. They are driven from a reversing shaft, connected to the blocks by means of the Reynold silent chain belting, which reverses all the blocks automatically when the triplex has reached the limit of its travel. The triplex block will raise its weight about 6 feet in 30 seconds, during which time the duplex and differential blocks hoist only about half as far, because they do not possess the high efficiency of the triplex. The belting for all the blocks is so proportioned that the motors are doing equal work, and the relative efficiency of the blocks is shown by the speed of the load and the height to which it is lifted in half a minute. In other words, the exhibit shows the comparative amount of lifting done with equal motive power for each block. The triplex block proves its high efficiency by lifting the same weight twice as high as the duplex or differential, with the same amount of power at the hand chain. The exhibit is well arranged and interests not only those who have to do with hoisting economics but the casual observer as well.

The Donora furnaces of the Carnegie Steel Co. are having the Bonar gravity automatic oiling system applied to all their engines. This comprises the five vertical cross compound steeple type condensing blowing engines, the three horizontal cross compound condensing engines in the power plant, and the two vertical pumping engines in the pump house. The system is being installed by James Bonar & Co., Inc., of Pittsburg. The same system has been installed at Washington, D. C., for the Government.

STEEL AND BRONZE UNIVERSAL JOINTS.

The Boston Gear Works, of Boston, Mass., make a line of universal joints, of which Fig. 1 shows the steel point and Fig. 2 the bronze pattern. The former has hardened square steel centers and hardened steel studs. The bearings of the studs on the centers are long and tapered. This allows backlash on account of the wear to be easily adjusted and keeps the joint in perfect shape, free from all looseness. One of the studs is fitted with a device for oiling the entire center of the joint. The bearings are dust proof. Owing to the design and careful construction with the latest modern tools, these joints run true within two or three thousandths of an inch. For this reason, when boring it is only necessary to true up the stems of the joint. By using care in boring, these

FIG. 1.—A STEEL UNIVERSAL JOINT.

joints run as near true as necessary for most mechanisms. The steel joints are designed for angles of zero to forty degrees. They are made in a number of sizes from ¼-inch to 2½-inch hubs.

Fig 2 shows the bronze universal joints with hard bronze stems and centers and hardened steel studs. These are so designed as to give a long bearing on all the studs. Each stud is securely fastened into the center, bringing the strain on the strongest part of the joint. All bearings are provided with oiling device. These joints are designed for a shaft angle of 25 degrees or less. Automobiles and most machines will generally require two joints. One great advantage of the types shown is that there are two different materials at the bearings. It has been proven that hard steel and bronze give the best results. This reduces friction to the minimum.

FIG. 2.—A BRONZE UNIVERSAL JOINT.

The bronze joints are made from 1¼ inches to 3 inches hub diameter.

The Barberton City Water Works of Barberton, near Akron, O., has placed an order with the Pneumatic Engineering Co., through the Pittsburg office of the Rand Drill Co., for a complete air lift plant for a new group of twelve wells. It is proposed to locate the air compressor in the new pumping station about 1,500 feet from the wells, and carry the air through a 5-inch main with branches to the several wells. The compressor is to be a Rand compound condensing, type 10, having steam cylinders 10 x 18 x 14 inches, and duplex air cylinders 14 x 14 inches. The equipment includes a surface condenser, air receiver, and the usual piping and specials to make up a pumping plant under this system. The capacity will be 3,000,000 gallons of water per day. It is expected to have the entire plant in running order by the middle of August.

A NEW SINGLE WHIP BUCKET.

The Forest City Boiler Co., of Cleveland, has designed and put into successful operation a clam shell bucket of some degree of novelty. The modern equipment of this type is of the double whip construction but there are many single whip forms which would usually involve the remodeling of the entire apparatus if an approach to the double whip facility were

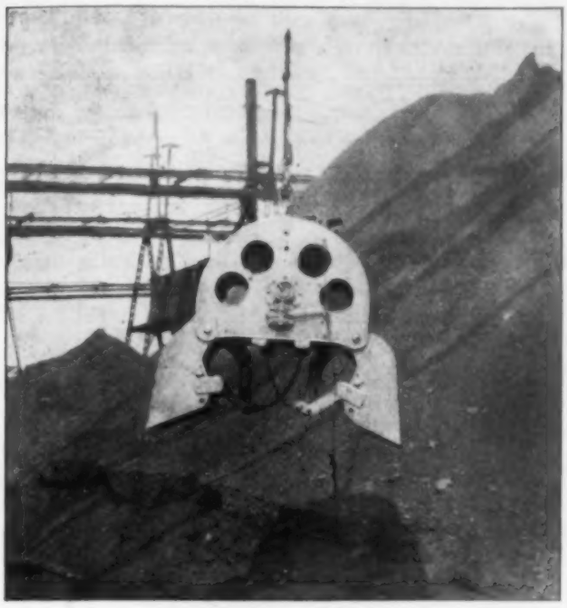


FIG. 1.—BUCKET AFTER DUMPING.

desired. The possibility of renovating the old equipment by some change which would not involve the reduction of the hoist as a whole to the condition of scrap has been a matter of extended experiment and thought. The present bucket is an ingenious endeavor to meet the needs of the situation and embody all the changes necessary in the clam shell, the whip and hoist remaining as they were.

The two photographs illustrate the 17-cubic-foot bucket as in operation on an ore pile at the N. Y. P. & O. docks at Cleveland. Fig. 1 shows the bucket at the instant of releasing the load and Fig. 2 is the appearance of the bucket after dumping the contents.

The halves of the bucket are hinged to the top housing on 3-inch shafts and the bucket is held open under digging and releasing conditions by strong coil springs. These are fastened to the back end of each bucket. Through the medium of a cast steel arm on each bucket half, chains from both pass to two 7-inch scored drums on a center shaft. This center shaft has a 24-inch power wheel in the center and has also (on the point extending beyond the casing) a ratchet wheel keyed securely in place. The ratchet wheel is engaged by a pawl with a hinged lever. It will be understood that a rotation of the center shaft of the housing will coil on the chains and close the bucket halves and the ratchet secures the bucket in opposition to the action of the springs. All the mechanism so far described, and in fact all the working elements, are placed on the housing and above the supported load.

The construction of the bucket may be best illustrated by following the action of the mechanism under operation. The supporting line (whip or cable) passes down into the casing of the bucket and is coiled on the 24-inch wheel in the center of the main shaft in the housing. The operation of the hoist takes up the line which unwinding from the power wheel turns the scored drums and therefore coils up the chains to the buckets. The ratchet wheel and pawl holds everything gained by the rotation of the shaft. When the bucket is closed, the hoist is reversed and the whip slacked back a sufficient distance to free the buckets to their extreme range of oscillation as the ratchet is tripped. The whip hook is then lowered and hitched into the bail seen on top of the clam housing and this leaves the loop of the line hanging loosely out of the way. A rope attached to the pawl lever trips the ratchet as shown in Fig. 1 and the springs together with the weight of the contents of the bucket at once act to fling the clam shell wide open. This separation of the halves winds the line loop on to the power drum and the bucket is again lowered to the loading position. The closing line is fastened to the end of the derrick cable separate from the hook and on lowering the bucket the bail is released and the cycle of operations starts afresh.

A noteworthy feature of Fig. 1 is the releasing position at about half the bucket travel. The action of the springs must be quick and powerful to cope with loads of this kind and the drop of suddenly freed and loose ore is also rapid. The camera has, however, been quicker than either and has shot the situation before the ore could drop away from the open bucket. Fig. 2 shows how far the rapidly separating halves move in swinging apart but the camera did not wait for the attainment of this final position.

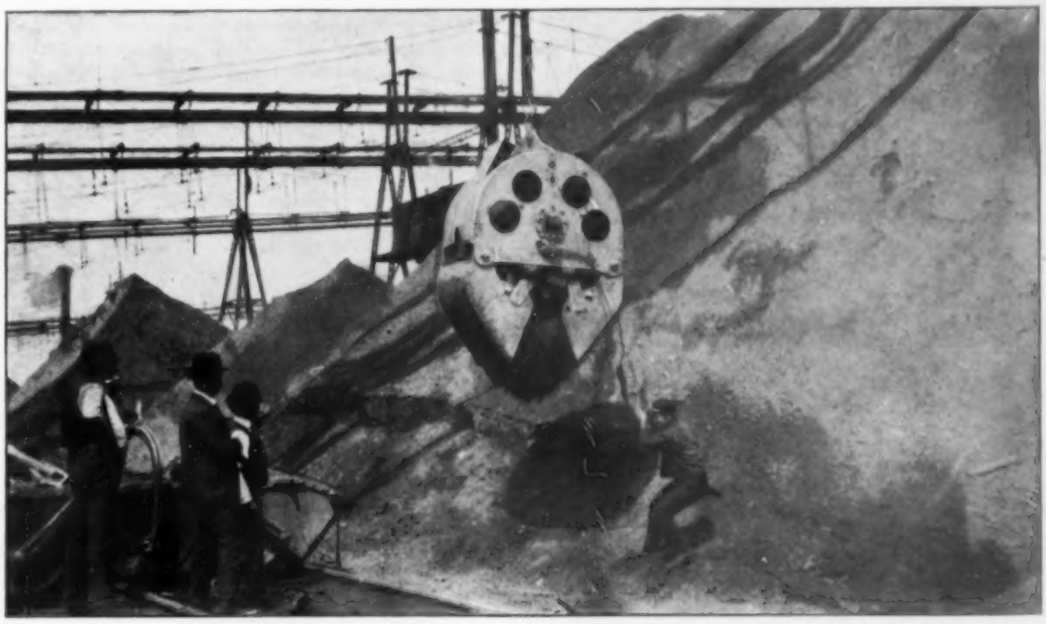


FIG. 2.—BUCKET AT MOMENT OF RELEASE.

The bucket shown weighs 1,800 pounds and under the conditions illustrated was capable of making a trip per minute. The buckets will be made in a number of sizes and are adapted to digging coal, sand, ore, etc., and are applicable to locomotive cranes, whirlies, trams and stationary derricks.

LASH DUPLEX PROCESS FOR STEEL MAKING.

Several patents have been allowed recently to Horace W. Lash, of the Garrett-Cromwell Engineering Co., of Cleveland, for improvements in the manufacture of steel. These relate principally to a modified arrangement, combining the Bessemer converter with the open-hearth furnace, commonly known as the "duplex" process. Mr. Lash's principal claim to invention is in the manner in which the various metals are brought together in the open-hearth furnace. Heretofore it has been the practice where the "duplex" process has been in use to Bessemerize the pig iron partially, then transfer it to an open-hearth furnace, where the refining of the metal is completed and it is converted into open-hearth steel.

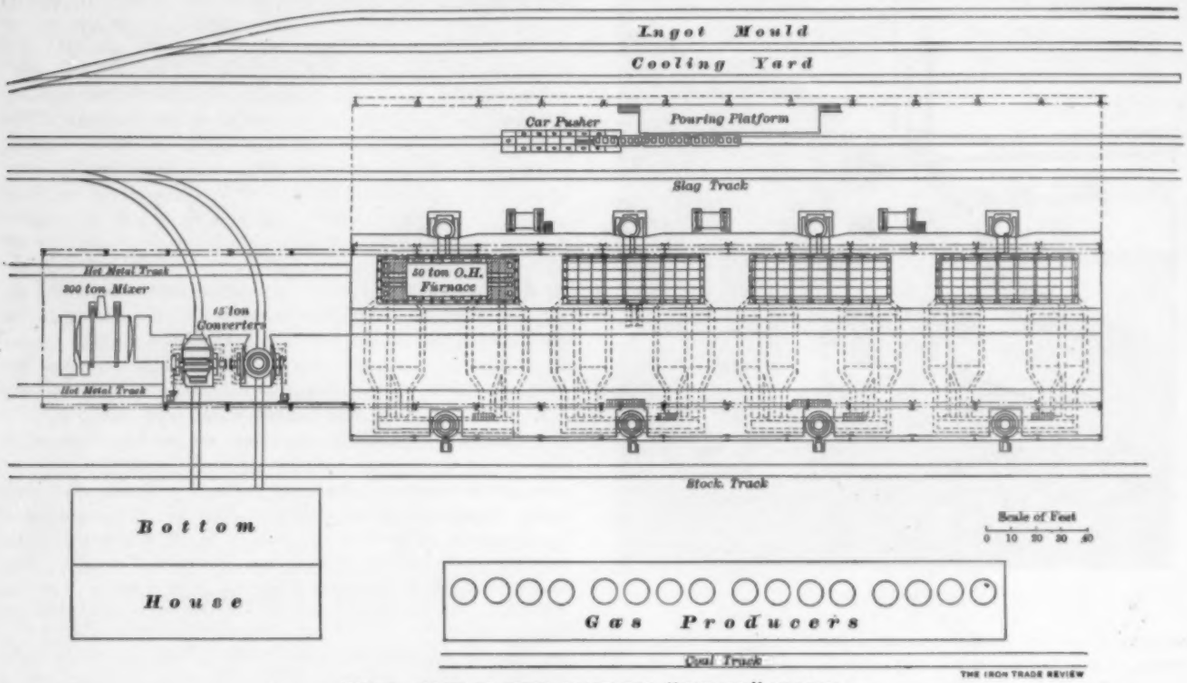


FIG. 1.—PLAN OF STEEL PLANT FOR "DUPLEX" PROCESS.

The inventor says of the method sometimes employed to treat Bessermerized metal in the open-hearth furnace:

"For the production of the finer grade of steel it has been found expensive to subject this Bessemerized metal to further treatment in the open-hearth furnace, for the reason that, having been deprived of all, or substantially all, of the carbon, the bath of the open-hearth furnace could not be held therein or treated for dephosphorizing without being entirely deprived of its initial, carbon. To a certain extent this has been overcome, either by shortening the period of treatment in the Bessemer converter, or by the addition of some carbon-bearing material to the molten metal in the open-hearth furnace; in either event, however, the expense or treatment has been increased. The intermediate step of the process referred to, i. e., treatment in the Bessemer converter, is exceedingly expensive, and since all of the metal run into the open-hearth furnace must, in the process referred to, pass through the Bessemer converter, the charges for labor, carriage, fuel, etc., are correspondingly increased.

"Another old method of manufacturing open-hearth steel is by melting pig iron, usually with scrap in the open-hearth furnace, and refining, or removing the manganese, silicon and carbon, by the addition of iron ore. Sometimes the scrap has been omitted, and, when desired, furnace cinder, scale, etc., have been substituted for or added to the molten pig iron. This process is, in any event, very slow. Recently, owing to the great demand of open-hearth steel scrap, such as used in the open-hearth furnace, has been quite scarce with a consequent increase in market price. It is, therefore, desirable to manufacture open-hearth steel from pig iron alone. In order to do this, it requires a much greater quantity of iron ore to refine the metal or remove the carbon and silicon from the liquid pig iron. This is also more objectionable where the pig iron used contains a large quantity of phosphorus, as the great amount of ore used in the open-hearth furnace for the purpose of oxidizing or removing the silicon and carbon, produces a very highly silicious slag, which is very detrimental to the removal of phospnorus. In treating pig metal alone, in the basic open-hearth furnace under these conditions, it requires about 12 hours to make a heat of steel of 40 to 50 tons.

"Still another method has been to provide the open-hearth furnace with a bath of refined metal having a covering of basic slag, and pouring into said bath successive charges of unrefined metal, and withdrawing a portion of said mass, leaving a remainder of the molten charge in the open-hearth furnace for admixture with a molten charge of unrefined or partially refined metal."

In the improved method described in Mr. Lash's patent only a portion of the pig iron to be treated is Bessemerized, but in this portion the manganese, silicon and carbon are entirely removed and the Bessemerized metal is highly charged with oxygen. The metal is then quickly transferred to a basic-lined open-hearth furnace which has been provided with a bath of unrefined iron high in metalloids and covered with a slag rich in iron. The mingling of the two metals at a high temperature causes a violent chemical reaction, during which action the oxygen contained in the Bessemerized metal attacks and quickly oxidizes the impurities contained in the unrefined metal and in return the metalloids in the unrefined metal act as a reducing agent and reclaim a very large percentage of the iron held in the form of oxide in the slag and

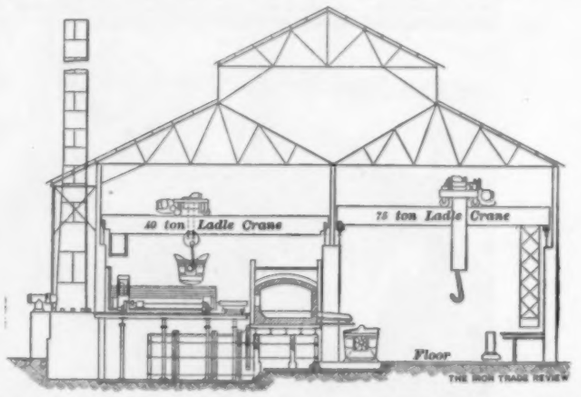


FIG. 2.—SECTION THROUGH OPEN-HEARTH BUILDING FOR DUPLEX PROCESS.

Bessemerized metal. In this way the loss in the combined process is reduced to a minimum.

The specification states that an exceedingly economical embodiment of the invention is about as follows: Charge the open-hearth furnace with 12½ tons of liquid pig iron direct from the blast furnace or mixer; at the same time start to blow 12½ ton heats in the Bessemer converter. Turn down when the flame drops and transfer as rapidly as possible to the open-hearth furnace. In this way three heats of 12½ tons each can be transferred from the Bessemer converter into the open-hearth furnace inside of one hour from the time the first 12½ tons of unrefined metal was charged.

The necessary basic additions, with a small quantity of ore, would be made largely after the initial charge of unrefined metal. In this way the lime and oxide of iron would be liquified and ready to perform their work by the time the last charge of Bessemerized metal was made. One hour would be all the time required to refine the bath and remove any reasonable amount of phosphorus. In this way a 50-ton heat would be tapped two hours after the first charge was made. One hour, or even less, would be sufficient time to clean and repair the furnace hearth and have it hot and ready to receive the initial charge from the blast furnace or mixer for the next heat.

The Bessemer converter would be kept in continuous operation, and as fast as one open-hearth furnace was filled the Bessemerized metal would pass on to the next. In this way it would make the round of the three furnaces every three hours. It is possible, however, that the Bessemerized metal could be delivered fast enough from one converter to serve four 50-ton furnaces, and in this way increase the output to 1,600 tons per day.

One great advantage claimed for the process is that iron of almost any chemical composition can be used, thus enabling the blast furnace mix to be made with a view to the lowest possible cost. The labor and fuel per ton of steel produced by this method will be less than in the regular open-hearth practice, and the loss will be very much less than in the regular Bessemer practice. The process can be worked to best advantage with all, or nearly all, pig iron, preferably direct from the blast furnace.

Mr. Lash lays great stress on the saving of labor and fuel due to the formation of but little slag in the open-hearth furnace and the absence of silica, in this way producing an ideal condition for the removal of phosphorus and sulphur. The saving in limestone and ore is also quite an item. The annexed illustrations are from drawings of an open-hearth furnace, Bessemer converter and mixer layout, with their accessories, for carrying out the operations described.

The Cleveland-Cliffs Iron Co., of Ishpeming, Mich., makes an annual distribution of prizes to its tenants for the best kept premises, vine planting, window box gardening and vegetable gardens. In a recent pamphlet the company gives a number of half-tone views showing the prize premises of the past year accompanied by a list of those who took prizes, these aggregating $200. The company refers with pride to what has already been accomplished by its tenants and by the city of Ishpeming in the direction of improvement in yards and homes.

The Twin City Corliss engine is thoroughly illustrated and described in a late catalogue of the Minneapolis Steel & Machinery Co., of Minneapolis. In the same connection a number of excellent views are given of the plant of the Minneapolis Steel & Machinery Co., completed within the last two years and one of the most extensive metal working establishments in the Northwest. It covers something over 18 acres and consists of machine shop 202 x 123 feet, foundry 202 x 111 feet, structural shop 294 x 136 feet, blacksmith shop 96 x 66 feet, pattern shop 80 x 48 feet, engine and boiler house 92 x 40 feet, bar iron warehouse 252 x 65 feet, and other warehouses for the storage of material and finished stock and patterns, offices 120 x 45 feet. The buildings have a total floor space of over 8½ acres. The catalogue makes special mention of the work of Mr. Joseph Garbett in perfecting the Twin City Corliss engine and describes in detail the various parts of the engine as preliminary to a series of views embracing the various styles of engines turned out at these works.

AMERICAN SOCIETY FOR TESTING MATERIALS.

Announcement is made by the secretary, Edgar Marburg, of the University of Pennsylvania, of the program for the seventh annual meeting of the American Society for Testing Materials, to be held at Atlantic City, June 16, 17 and 18. The Hotel Traymore will be headquarters, and the sessions will be held there, except those of Friday and Saturday mornings, which will be on the steel pier. The program follows:

FIRST SESSION, THURSDAY, JUNE 16, 3 P. M. ....

On Preservative Coatings.

Minutes of the Sixth Annual Meeting.

Annual Report of the Executive Committee.

Report of Committee E: On Preservative Coatings for Iron and Steel. S. S. Voorhees, chairman.

The Protection of Structural Steel. C. L. Norton.

Results of an Investigation Concerning Causes of Durability of Paints for Structural Work. Robert Job.

Preservative Coatings for Iron and Steel. Cyril de Wyrall.

The joint discussion of the report of Committee E and the foregoing papers will be opened by Dr. C. B. Dudley and Dr. A. H. Sabin.

Election of Officers.

SECOND SESSION, THURSDAY, 8 P. M.

Annual Address by the President: The Influence of Specifications on Commercial Products.

Alloy Steels: Self-Hardening and High-Speed. William Metcalf.

Some Statistics of the Cement Industry in America. R. W. Lesley.

Miscellaneous Business.

THIRD SESSION, FRIDAY, 10 A. M.

Separate meetings will be held at this session by the sections on Cast Iron and on Cement.

On Cast Iron.

Report of Committee B: On Standard Specifications for Cast Iron and Finished Castings. Walter Wood, chairman.

This report will embody proposed standard specifications for:

(a) Foundry Pig Iron.
(b) Pipe and Special Castings.
(c) Locomotive Cylinders.
(d) Car Wheels.
(e) Malleable Castings.
(f) Gray-Iron Castings.

The discussion will be opened by Dr. C. B. Dudley, who will speak especially on Specifications for Car Wheels, and Dr. Richard Moldenke, who will present a summary of the discussion of the above specifications at a meeting of the American Institute of Mining Engineers, in March, 1904.

Cast Iron: Strength, Composition, Specifications. William J. Keep.

Pig Iron Feasts and Famines; Their Causes and How to Regulate Them. George H. Hull.

Miscellaneous Business.

On Cement.

Report of Committee C: On Standard Specifications for Cement. George F. Swain, chairman.

Practical Cement Inspection. Charles F. McKenna.

Some Possible By-Products in the Portland Cement Industry. Clifford Richardson.

The Boiling Test for Portland Cement. Frederick H. Lewis.

Tests of Steel-Concrete. A. N. Talbot, F. E. Turneaure, Edgar Marburg.

The Mechanical Defects of Sieves used in Determining the Fineness of Cement. E. W. Lazell.

Miscellaneous Business.

FOURTH SESSION, FRIDAY, 3 P. M.

On Specifications.

Report of Committee A: On Standard Specifications for Iron and Steel. William R. Webster, chairman.

Report on the Specifications for Iron and Steel Structures, American Railway Engineering and Maintenance of Way As-

sociation, as Amended and Adopted in March, 1904. J. P. Snow, chairman.

Comparison of the Specifications for Axles and Forgings, Proposed by Committees of the American Railway Master Mechanics' Association, and the American Society of Mechanical Engineers, with the Standard Specifications Adopted by the American Society for Testing Materials. H. V. Wille.

Report on the Specifications for Steel Rails, American Railway Engineering and Maintenance of Way Association, as Amended and Adopted in March, 1904. William R. Webster, chairman.

Specifications for Air-Brake Hose. Max H. Wickhorst.

Miscellaneous Business.

FIFTH SESSION, FRIDAY, 8 P. M.—ANNUAL SMOKER.

A Brief Review of the Status of Testing in the United States. Gaetano Lanza.

Structure of Alloys. William Campbell.

The Effects of Preservative Treatment on the Strength of Timber. F. A. Kummer.

The Early History of 60,000-pound Structural Steel. Samuel Tobias Wagner.

Miscellaneous Business.

SIXTH SESSION, SATURDAY, 10 A. M.

On Steel and Magnetic Testing.

Report of Committee G: On the Magnetic Testing of Iron and Steel. J. Walter Esterline, chairman.

The Commercial Testing of Sheet Steel for Electrical Purposes. C. E. Skinner.

Permeability of Cast Steel. H. E. Diller.

Proposed Tests for Controlling the Heat Treatment of Structural Steel. J. P. Snow.

Tests for Detecting Brittle Steel. William R. Webster.

Nomenclature of Iron and Steel. Albert Sauveur.

Miscellaneous Business.

SEVENTH SESSION, SATURDAY, 3 P. M.

Miscellaneous Subjects.

Report of Committee H: On Standard Tests for Road Materials. Logan Waller Page, chairman.

Tensile Impact Tests of Steel. W. K. Hatt.

The Desirability of a Uniform Commercial Speed for Testing. Paul Kreuzpointner.

Staybolt Iron and Machine for Making Vibratory Tests. H. V. Wille.

A New Chuck for Holding Short Test Pieces. T. D. Lynch.

Bending Moments in Rails. P. H. Dudley.

Miscellaneous Business.

At the plant of the William B. Pollock Co., Youngstown, O., builder of all kinds of steel plate construction, has been installed a modern hydraulic flanging plant of the largest size built. This additional equipment enables the company to bend and form the heaviest sections of structural material as well as flange and bend plates up to 2½ inches thick, and it now covers a wide range of work in heavy plate construction.

The Hendrick Mfg. Co., of Carbondale, Pa., manufacturer of perforated sheet metals, has opened an office in New York City in the Singer building, 149 Broadway, corner of Liberty street. C. J. Thompson is resident manager.

"Glimpses of Greater Cleveland" is the title under which the Whitworth Bros. Co., of Cleveland, presents a souvenir pamphlet containing a hundred illustrations, among them several monumental buildings. The ore, coal and dry docks shown are typical of marine and commercial Cleveland, and there are a number of representative river, lake, canal and harbor views, some of them contrasted with old views dating back seventy years.

The Lewis Foundry & Machine Co., of Pittsburg, manufacturer of iron and steel works machinery, chill and sand rolls and special machinery, present catalogue No. 14, which is 6¾ x 10 inches. It illustrates in full the various products of the company, including housings, roll trains, complete plate mills, angle straighteners, roll lathes and various styles of shears with engines. The company's chilled rolls are manufactured by the even depth chilling method, on which it has American and foreign patents.

NOTEWORTHY TYPES OF STEEL CASTINGS.

The accompanying illustrations represent two steel castings recently made by the Wellman-Seaver-Morgan Co., of Cleveland. The steel rudder stem is of particular interest as representing an exceedingly difficult piece of work, as may be judged from its length and shape. The bottom leg or sloping base of the casting is 8 feet 2 inches long and the upright 22 feet 8 inches long. In fact it had been considered by many practically impossible to produce so long a steel casting having so small a section.

A notable tendency of late has been the use of steel castings for the heavier forms of work where ordinary gray iron castings have long been employed. The hydraulic cylinder shown is an example of the massive steel castings now being called for and supplied. Its size is noteworthy. It is 86 inches long

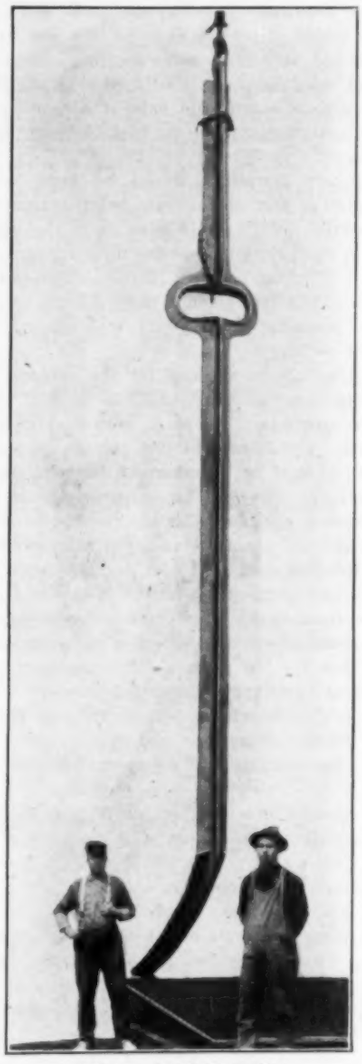


FIG. 1.—RUDDER STEM.

and 37 inches in diameter, the diameter of the core being 23 inches. The weight is about 10 tons.

More than one recent accident in England where blast furnace gases are utilized in gas engines illustrates one of the most subtle and yet fatal dangers accompanying the use of this gas. The gas consists largely of carbon monoxide (CO), which is a deadly poison when inhaled, and its effect is to almost imperceptibly overpower the victim without any premonitory warning. A mixture of as small a quantity as 2 percent in the atmosphere is sufficient to cause death, and indicates how serious is the danger of even a slight leak.—[*Power.*

The Sheet Metal Mfg. Co., of Niles, O., has recently sent out a souvenir to the trade, which is a handsome piece of embossed work intended as a desk ornament.

LABOR-SAVING SUGGESTIONS FOR THE FOUNDRY.*

BY H. F. FROHMAN, CINCINNATI.

Many articles have been written on labor-saving devices, and important facts brought out by able writers, but I desire to put the question before the foundrymen from the standpoint of the practical foundry supplyman, who has had many years' experience, and has visited probably almost all the leading foundries of this country.

I will not dwell on the necessity of having good equipment, such as suitable cranes, designed and constructed for the class of work they are to do, an up-to-date, economical melting cupola, with all the proper appurtenances; nor on a battery of exhaust tumbling mills for cleaning castings; nor on the methods for distributing iron; but will dwell on the minor articles, such as are usually overlooked in the large shop.

I readily appreciate the fact that many foundrymen will say we have all the foregoing, and why should we not produce our castings at the minimum cost? Yet there are many small labor-saving devices that can be introduced, which, used in connection with the more important equipment, and with good management should make the foundry business a successful one.

FIG. 2.—HYDRAULIC CYLINDER.

While foundry supply men are considering a nuisance by some, to others, we are happy to say, they are heartily welcome. The foundry supply man is brought in contact with the foreman and molders, and an an exchange of ideas has resulted in many a simple and successful device being put on the market to the benefit of all concerned.

While the writer was visiting a certain foundry he noticed a molder using a perforated piece of tin to hold up the core in the mold. The idea seemed to be excellent, and the explanation of the molder that the tin being perforated allowed the iron to alloy with it more thoroughly than would otherwise be the case seemed conclusive. The suggestion was taken up, and now perforated tin chaplets are on the market in all sizes that are required. Foundries making very thin castings have found them exceedingly serviceable; in fact, they would not do without them if they could help it.

Another simple thing is a core coating. This is used on a steel core, where a number of these may be used in one casting. The method is to dip the steel core into the coating, set it into the mold, and the iron will flow freely around it, making a perfect hole with neither a chill nor a blow.

*Read at the Indianapolis meeting of the American Foundrymen's Association, June, 1904.

A mold drying apparatus. This is a device for doing away with burning charcoal in a dry sand mold. It is used with a direct flame from a torch, in connection with compressed air, the result being more economical and satisfactory than the old style.

My attention was also called to the chiseling out of follow-boards and match parts, and after much study and experiment with the assistance of the shop and the laboratory, a compound was gotten up which can be poured into a temporary mold, using the original pattern, and a satisfactory match made at one-tenth the cost of the old method. After setting, this match becomes almost as hard and as true as the iron itself, and makes an excellent follow-board or sand match, which becomes better as it gets older, and retains perfect parting.

In many foundries where dry sand molds are made, it seemed a hard problem to put a liquid blacking on the molds evenly and well distributed. It seems that when this blacking is prepared to use, and allowed to stand a few minutes the blacking settles at the bottom. This trouble is now obviated by using a compressed air blacking swab. This swab mixes and distributes the blacking very evenly over the surface of the mold, and can reach any part inaccessible to the hand. For this reason the result is much more perfect, and the castings brighter, cleaner and better in every way.

I might also mention the various designs of sand-sifters used in a foundry. By adopting these machines, many a dollar has been saved. There are now machines on the market which can riddle as much sand in one hour as formerly required the labor of two men for a whole day. It is also said that these machines temper the sand much more thoroughly. Facing sand may be prepared by them, and their use in the core-room is also highly advantageous for mixing sand with the various compounds, flour, or rosin.

I remember, years ago, there was a certain foundry in Ohio, where they employed girls to make the cores. Should a stray salesman happen to wander in to see the foreman, these girls would spy him, and take all the conceit out of him that he ever possessed. I happened to be in that foundry again a few years later, dreading to approach that core-room, but to my agreeable surprise found the young ladies wanting, and instead two boys operating two machines for making cores which formerly were made by not less than twenty-five persons. The machines were constantly fed, and as fast as the wheel could turn made satisfactory cores, true and round, and well vented, in fact faster than the molders could use them.

In this same shop, powdered rosin was constantly used, and formerly two men were required to grind it by hand. Later on, a machine was devised for powdering and pulverizing rosin, which operated at a very low cost. It now runs for two hours, in charge of a boy, and produces more powdered rosin than is used for a day.

A word regarding the use of good facings and blacking may not be amiss. I have noticed that where formerly foundrymen used graphite by the pound, it is now used by the ton, showing conclusively that it is more economical to use high grade plumbago to face a mold, at a few cents cost, than to spend dollars in the cleaning room in cleaning and chipping castings. Furthermore, it is to the interest of the foundryman to purchase a grade of facings and blacking suitable to his class of work, and the very best is always the cheapest. As advancement has been made in the foundry, so it has in the manufacture of facings and blackings. The materials are turned out with the most modern machinery, and the raw materials kept under chemical control. The foundry facing man now knows that he is furnishing the proper material for the particular purpose.

Many other simple labor-savings devices could be enumerated, as having come under my notice, and all of them would not only become sources of economy, but also result in considerable profit to the foundryman.

Machinery hall, unlike the other buildings at the St. Louis World's Fair, is not closed in the evening. Visitors will find at work there, up to 11 p. m., the big 5,000-h. p. Allis-Chalmers-Bullock engine and generator producing the electric current to keep aglow the 120,000 decorative lights scattered over the buildings and grounds.

THE CORE BENCH.*

BY BENJ. D. FULLER, ALLEGHENY, PA.

The management of the core bench, while of the greatest importance in the production of good castings at a reasonable cost, does not always receive the consideration it should, hence a little discussion of the subject may be of interest.

Be the foundry large or small, it will pay to study the different sands and mixtures, selecting the most suitable for a given job or class of castings. For instance: We do not like to see a small, light-lettered, box casting come from the cleaning room shining, with letters perfect, no fins, showing good molding, but rough and lumpy in the inside from the use of an improper core, made of coarse sand and smeared over with thick blacking.

A good core for work of this kind will be found in one made of fine bench molder's sand and molasses water, used the same day or the day after making. It will give a casting as smooth and shiny inside as out. This core should not stand in stock where it will be subject to dampness or it will become soft and worthless, the molasses being amenable to moisture. No blacking should be used, and the burnt core is readily rapped from the casting. By adding a little new sand each day the material can be used repeatedly.

The mixture of ground rosin and fine sharp sand is an excellent one to use for certain lines of light and medium heavy castings, as it leaves them readily and gives a smooth finish. The rosin must be in proper proportion, as if too strong, the cores will be very hard and will blow. Even if they do not blow, the castings will be found to have a mottled appearance or be full of fine spots or holes. This core is quickly dried, and hence is the thing to use for hurried work where feasible. It cannot be handled hot, but must be allowed to cool in order that the rosin may become set. After this the core will be found quite strong. If equipped with a rosin pulverizing mill, this is an economical mixture.

Where a smooth, small hole is desired through a body or iron, molding sand and oil seems to be the thing, but where the core is light and of considerable length, a difficulty in using this mixture is that it will shrink and warp. While this can be overcome to some extent, it has its drawbacks in making cores of certain shapes. The oil and sharp sand core is an excellent one where strength is desired, also a core which will vent readily, and can be rapped from the casting easily. For cylinder jackets, ports, radiator and similar castings this is good.

The old saying that a thing "well begun is half done" is applicable particularly to core work, as where any considerable number of cores are to be made which present an uneven surface to be turned out upon the plate, it is wise to construct a pattern and cast dryers rather than to use a frame and bed in loose sand, as is practiced much.

Likewise in making large work much time and worry are saved by shaping an arbor pattern and casting a sufficient supply rather than hunting up rods of different sizes and shapes, bending and straightening, cussing and fussing over them, and frequently turning out a worthless core at that. Money is well spent in the purchase of good sifters, anvils and rod straightening and cutting devices, also in having a man straighten out and assort rods and hooks, arrange plates and attend to work of this character.

As is well known, sand that has been properly mixed and tempered is much more likely to produce good work than sand which has not been so treated. But as an illustration let me cite a case from experience: Cores for large work were being made from a mixture of compound and sand at a ratio of one part compound to twenty-two parts sands, mixed by hand. After installing a power machine which mixed and tempered the batch thoroughly, better results were obtained from a mixture of the same sand and compound at a ratio of one of compound to forty of sand. This seemed a reasonably cheap mixture, but by using different materials we are now able to produce sixty parts for the same cost as twenty-three parts first mentioned.

The foreman coremaker should be a man capable of at once deciding how and of what mixture a core should be made, who is to make it, etc. Time records should be kept. A record of boxes in and out of order is also essential, so that any desired box may be located quickly.

An accounting system whereby access can be had to the cost of general labor per pound of output as well as the cost of core material per pound will be found of value, as by this means comparisons can be made at any time.

As essentials let me also mention good ovens, cranes, handy water attachments, steam jets leading into bosh for mixing of materials, such as core compounds and blacking, etc.; over all, vigilance eternal as well as rectitude of conduct in dealing with employes, and good results can be obtained.

*Read at the Indianapolis meeting of the American Foundrymen's Association, June, 1904.

RECEIVED FROM THE TRADE.

A. E. Masten & Co., of Pittsburg, have published an interesting little pamphlet under the title "Method of Investment and Speculation in Pig Iron Warrants." The earlier pages are given up to some explanation of the pig iron warrant system, together with the rules for dealing in pig iron warrants adopted by the Pittsburg Stock Exchange. Then follow sixteen pages of statistical and other matter prepared by Mr. B. E. V. Luty. A condensed description is given of the process of manufacturing pig iron and steel, and the various classes and grades of pig iron and steel and the various classes and grades of pig iron are defined in a lucid and comprehensive way. The various warrant classes are also referred to and the distinctions drawn between the different varieties of iron. The statistical matter includes the record of pig iron production in the United States from 1810, price fluctuations in pig iron from 1897 to the present month and a statement of the production of pig iron by States and districts. The whole makes a handbook of distinct value.

In a pamphlet of 48 pages the Dobbie Foundry & Machine Co., of Niagara Falls, New York, presents interesting data with illustrations of its sheave blocks and sheaves for wire and manila rope. In connection with each illustration the pamphlet gives diameters of the sheave, shows its capacity in tons and gives the price. The pamphlet constitutes catalogue No. 12 of the publishers.

"Annealing, Hardening, Tempering and Case Hardening" is the title under which F. W. Braun Co., of Los Angeles and San Francisco, present some well digested information that has to do principally with the Braun portable forge and tempering furnace. There is some matter of general application and in the latter part of the booklet the uses to which the Braun forge and furnace is especially adapted are set forth in detail.

"Cambria Steel Cars" form the subject matter of a cloth bound, flat book recently published by the Cambria Steel Co., of Johnstown, Pa., and Philadelphia. The cuts, which are highly artistic, are from photographs of cars recently constructed by the Cambria Steel Co. for a number of railroad systems and represent the late developments in steel car construction. The company has been manufacturing cars for sale in quantities since 1901, but on the 100 miles of its own tracks it has had for quite a number of years cars of its own construction in use. The employment of standard structural shapes gives a combination of strength with lightness and the point is made that its construction gives a car that can be easily repaired in a shop equipped with ordinary machinery. With the exception of a few specialties the company manufactures its cars complete, from the ore to the finished car. The various designs described in the book before us include the drop door gondola, center dump hopper ore bin car, side and center dump hopper car, long gondola with drop ends, long flat car with wooden flooring, hopper bottom gondola, coke bin and other styles of hopper car. A noteworthy form of construction is a gondola car with sixteen drop doors. This car dumps without shoveling, about 90 percent of coal, loose rock or similar material.

Safety hooks for hoisting cages in mines are the text of a striking pamphlet with illustrations and clearly printed letter press from the publicity department of the Wellman-Seaver-Morgan Co., of Cleveland. The design of the hook is such that any premature action of the safety clutch is impossible and the operation is absolutely certain when the danger point is reached.

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JUNE 9, 1904

COMMERCIAL SIDE OF THE STEEL TIE QUESTION.

There is increased interest in the steel railroad tie as a result of the general slowing down of the iron and steel industry. The prospective cost per pound of a practicable tie is much lower than it was a year ago and this has greatly encouraged designers and railroad men, while the steel interests have been working hard on the subject themselves. Nothing offers the promise of so much tonnage as the steel tie. On leading steel interest has had a force of men at work for weeks in a study of the whole subject.

While the probable cost of the steel tie has been dropping there has been no change in the aspect of the wooden tie. In a very few years the dollar tie will be a reality with roads in some districts. This view has recently been given official utterance in a report by an executive head of one of the leading Eastern railroads.

We have already pointed out that a steel tie, to be adopted, must of necessity fall within a certain cost limit, as referred to the wooden tie. This is a point which the independent designer does not always grasp. The fact that a steel tie will outlast many wooden ties is put forth as a defense for the greater cost. First, however, is but one item, and when one gets into longevity such as is attributable to the steel tie, the question of interest is of more importance. The interest cost on a wooden tie is small, with a life of eight years, compared with its cost, but supposing there was no interest charge at all against a wooden tie there would still be a limit to the cost of a steel tie, no matter how durable. Suppose it were possible to use a wooden tie costing ten cents and lasting one year instead of one costing 80 cents and lasting eight years. Then the annual cost would simply be ten cents, but this is the interest, at only 5 percent, on only $2, which would be the limit of cost of a steel tie. This takes no account of the work of replacement, but it is not safe to figure on this, as steel ties may require considerable care.

A simple method of figuring the relative expense of wooden and steel ties is to assume a stretch of track, for which, under present conditions, an appropriation of $1,000 would be made for wooden ties every eight years. Supposing a steel tie to last 24 years (and to assume a longer life, while perhaps not unsafe, would not greatly help the case), then for the purchase of steel ties the initial $1,000 would be available, plus such money as could be borrowed and replaced by the second and third appropriations. Assuming that money would be borrowed at 5 percent, then the present value, at 5 percent compound interest, of $1,000 due in eight years, would be $677; the present value of $1,000, due in 16 years, would be $458. The sum of these, $2,135, could be invested in steel ties in place of wooden, and at the end of 24 years the steel ties would presumably still be there, while if wooden ties had been used a fresh appropriation would be due.

This represents a cost of steel ties 2.135 times that of wooden ties, with a possible advantage in saving the cost of laying two extra wooden ties. With steel products at last year's prices the problem was very difficult. With steel mills anxious for the large and steady tonnages which steel tie manufacture would afford, the problem may be much simpler. The production of a rolled section for a steel tie would permit of economies impossible even with such staple forms as beams, rails or plates, and the selling price, outside of machine work and fittings, could easily be considerably under a cent a pound and still afford a good profit. Compared with wooden ties at 80 cents, a steel tie costing a cent a pound total might weigh, on the above basis, 170 pounds, and this is certainly not an impossibility. Some ties, unsatisfactory only in their design, have been brought out with a weight considerably less.

BUSINESS, CROPS AND CONFIDENCE.

Amid the many discouraging features of the business situation it is gratifying to find one development of a favorable nature and that connected with the major crops upon which the prosperity of the country is largely based. The Government's June report of the condition of cotton indicates that the late lamented corner in the staple was not an unalloyed evil, since to the high prices resulting from such manipulation the large increase in the acreage planted may be directly traced. The Department of Agriculture estimates that the total area planted in cotton in the United States this season is in round numbers 31,730,000 acres, an increase of over 2,800,000 acres or 9.8 percent over the acreage planted last year, while the average condition of the growing crop on May 26 was 83 as compared with 74.1 at the corresponding date last year. With the exception of 1902, when the condition was placed at 95.1, this is the most favorable showing since 1899, when the condition was 85.7.

It should be remembered that a large crop usually means a lower average price for the staple; but it also means an increased export movement and better returns to railroads, textile mills and nearly all other interests connected with the general industry; even the planters often making up in amount of staple sold the apparent loss through a lower price which the larger crop induces.

Turning from cotton to the grain crops, however, the outlook is less encouraging. The heavy and almost

continued rains in the winter wheat belts west of the Mississippi river, and in the Northwest within the last few days, have been unfavorable developments, and the loss to the country at large may be, to a certain extent, measured by the increase in the current market price of the grain. Abnormally high cost of bread stuffs as well as other commodities has been one of the most serious impediments to business in this country for many months.

Similar conditions have brought about equally unfavorable results in the outlook for corn; the heavy rains in the corn region preventing cultivation of the plant which is already up, tending to rot the seed in the ground and further retarding planting in the bottom lands. In fact, those who give their whole attention to cereals are of the opinion that the condition of corn at the present time is almost as serious as it was last year. But the decided turn in weather conditions of the last few days if continued will bring about radical changes for the better.

In the bank clearing house returns and railroad gross earnings economists find a little more cheering information. The *Financial Chronicle* estimates that the bank clearings for the month of May were but 9.9 percent less than during the corresponding month last year. While these figures reflect the continued contraction in the volume of trade, they also show that the shrinkage as gauged by the comparisons instituted during preceding months of the current year, has been less; but it should be remembered that in May last year there had been already a material falling off in business, especially in the iron and steel industry. Yet take in connection with railroad gross earnings, which during the third week of May averaged less than 1 percent under last year's figures, they are signs to encourage hope at least.

Another interesting feature of the business situation is that the rate of failures during the month of May has shown the smallest aggregate of liabilities for any month during the current year, and only about half the amount of heavy failures of last winter. This is doubtless the result of the extreme conservatism that has been exercised in business affairs since last fall.

In financial circles much significance is attached to the fact that securities are held in strong hands, there being little if any liquidation. But even those occupying strong financial positions are vulnerable. It is well to keep in mind that railroads with their loads of heavy floating indebtedness and fixed charges are to a great extent dependent upon the harvests and the mines.

Confidence throughout the business world has been shaken by the exposure of unsound financial methods employed especially in industrial affairs, and until this element is restored even increased railroad earnings or good crops cannot give the sustaining force necessary. Lack of confidence has given birth to the wave of pessimism and the bearish spirit that has swept the country for months. Confidence is a plant of slow growth, yet it will flourish; it is only a question of time. So far as the iron trade is concerned the present lack of confidence is not only in the sufficiency of demand in the remaining months of the year, but in the maintenance of prices. There is a feeling among those who look below the surface developments from week to week, that the iron trade will not move on again with any freedom until there has come such a readjustment of labor and raw material costs and of the selling prices of finished products as has shown scarcely more than a beginning in the developments of the year thus far. So far as the labor problem is concerned, time and the sobering influence of a slower pace in industry seem to offer the only promise of such a readjustment as will lead again to real and healthy prosperity.

PHILADELPHIA FOUNDRYMEN'S ASSOCIATION.

The 138th meeting of the Philadelphia Foundrymen's Association was held at the Manufacturers' Club in Philadelphia on Wednesday, June 1, the vice president, Alex E. Outerbridge, occupying the chair.

The committee having in hand the arrangements in regard to the dinner given in May to the New England and Pittsburg foundrymen's associations was discharged with the thanks of the association for the creditable manner in which it had performed its duties.

E. E. Brown, in behalf of the committee appointed to represent the association at the World's Fair, said that the committee was now inactive in consequence of the exposition authorities having taken over the entire work of establishing the exhibit. It was expected that all plans formulated would be carried out, and the exhibit be completed by July 1. All applications for exhibition space would be received by the authorities, and all expense would be borne by them in the erection of the foundry building, excepting the foundrymen's headquarters, toward the expense of which subscriptions would be accepted.

The Delaware Steel Castings Co., of Chester, Pa., represented by G. Weaver Loper, was elected to membership in the association.

The paper of the evening was by P. McN. Bennie, of the firm of Fitzgerald & Bennie, whose laboratories are at Niagara Falls, and was entitled, "Application of the Electric Furnace to the Treatment of Iron and Steel." The paper, which also treated of the refining of iron and the production of special grade of steel was illustrated by lantern slides. An abstract will appear in our issue of next week.

In the discussion, in answer to a question by Mr. Evans as to the removal of slag, in connection with electric refining Mr. Bennie said at was removed periodically. It accumulates above the level of the molten metal and is very fluid. Mr. Davis asked as to the effect on the brick of the high temperatures used. This Mr. Bennie said was one of the problems. In these furnaces the electrical properties are distinctly thermal, the ordinary metallurgical properties of the metals remaining unchanged.

A vote of thanks was tendered Mr. Bennie for his paper and his thorough illustrated exposition of the subject.

The arrangements made for visiting the World's Fair with the members of the New England Foundrymen's Association were detailed to the meeting. They also made provision for a stopover at Indianapolis during the convention of the American Foundrymen's Association. A representative of the company organizing the trip was present and afforded other information required.

The matter of inviting the American Foundrymen's Association to hold its next convention in Philadelphia, was brought up and was referred to the executive committee.

The following were in attendance at the meeting:

A. E. Outerbridge Jr., Wm. Sellers & Co.
E. E. Brown, E. E. Brown & Co.
W. W. Phillips, Fairbanks Co.
L. P. Clark, Abram Cox Stove Co.
Chas. Orr, Thomas, Roberts, Stevenson Co.
F. T. Wright, U. S. Cast Iron Pipe & Foundry Co., Burlington, N. J.
L. Sylvester, J. Wesley Pullman.
G. W. Haag, North Wales Foundry Co., North Wales, Pa.
G. H. Schuler, Merchant & Co.
E. E. Wilson, Bateman Mfg. Co., Grenloch, N. J.
W. O. Steel, Bateman Mfg. Co., Grenloch, N. J.
W. McDonald, Schaum & Uhlinger.
C. Gorman, Schaum & Uhlinger.
W. A. Perrine, Abram Cox Stove Co.
Jos. S. Hibbs, J. W. Paxson Co.
Frank C. Hibbs, J. W. Paxson Co.
Jas. S. Strain, Robt. Wetherill & Co., Wilmington, Del.
August Williams, Enterprise Mfg. Co.
Fred. Stahl, Girard Iron Works.
A. G. Warren, J. W. Paxson Co.
Walter S. Bickley, Penn Steel Casting & Machine Co., Chester, Pa.
H. L. Haldeman, Pulaski Iron Co.
A. A. Miller, *Iron Age*.
T. B. Harkins, Harkins Foundry Co., Bristol, Pa.
A. D. Wallace, E. E. Brown & Co.
H. O. Evans, Thos. Devlin & Co.
Geo. C. Davis, Chemist.
J. Hy. Pepper, *The Iron Trade Review*.
P. McN. Bennie, Fitzgerald & Bennie, Niagara Falls, N. Y.
J. Thompson, J. Thompson & Co.
Jas. H. Brooks, Harkins Foundry Co., Bristol, Pa.
Fred. K. M. Jones, Raymond & Whitcomb Co.
Howard Evans, J. W. Paxon Co.

The Labor Situation.

EASTERN ROLLING MILL SCALE.

The Eastern bar iron scale as prepared by the Amalgamated Association and which will shortly be presented to the Eastern manufacturers allows a differential in favor of the Eastern mills of $1.25 per ton for boiling. The price for muck mill rolling is one-sixth the price paid for boiling, while the Western iron scale calls for the payment of only one-seventh of the boiling price. On busheling on sand bottom the differential in favor of the Eastern mills is 30 cents a ton. The Western scale on bar and 12-inch mills provides for the payment to the roller and heater 61.7 cents per ton on a one-cent base, while the Eastern scale provides for 47 cents to the roller and 50.7 cents to the heater.

In the memorandum of agreement of the Eastern scale the second clause remains the same as in the Western scale of 1903-4, but a change in this clause has been proposed for the Western scale. This provides that on all mills working iron and steel weighing 150 pounds or over extra help shall be furnished the heater. This clause is to remain unchanged for the Eastern mills, but for the Western mills the limit of weight is to be reduced to 130 pounds. Clauses five and six of the Western scale are not included in the Eastern. The differences between the wages paid for boiling are compared as follows:

Selling price bar iron.	Eastern scale boiling ton of 2,240 pounds.	Western scale boiling ton of 2,240 pounds.
1.0c bar iron	$3 75	$5 00
1.1c bar iron	3 75	5 00
1.2c bar iron	3 75	5 00
1.3c bar iron	4 00	5 25
1.4c bar iron	4 25	5 50
1.5c bar iron	4 50	5 75
1.6c bar iron	4 75	6 00
1.7c bar iron	5 00	6 25
1.8c bar iron	5 25	6 50
1.9c bar iron	5 50	6 75
2c bar iron	5 75	7 00

Footnotes in the Eastern boiling scale correspond as follows with those of the Western scale now in force as follows: Two, three, four, five, seven, eight, nine, ten, eleven, twelve, thirteen, fourteen, fifteen, sixteen, seventeen, eighteen, nineteen, twenty, twenty-one, twenty-two in the Eastern scale are the same as three, four, seven, eight, ten, eleven, twelve, thirteen, fourteen, sixteen, eighteen, nineteen, twenty, twenty-two, twenty-three, twenty-five, twenty-six, twenty-seven, twenty-eight, twenty-nine in the Western scale respectively.

Note six which is new follows: "For wrought iron turnings, worked on cinder bottom, 65 percent of boiler's scale shall be paid. The price for working turnings to advance and decline in the same proportion as the boiler's scale, and when working wrought or steel turnings that are dirty or mixed with brass to the extent that it will not roll up clean, that seven-eighths of the boiler's scale shall be paid."

Notes 23 and 24, which do not appear in the Western scale follow: "That $1 per ton shall be paid extra for all heavy castings weighing 150 pounds or over when worked in a boiling furnace. That boiler's helpers shall be paid one-third of the boiler's wages, and 3 cents per heat buggy money to be paid by the company when helper has to run iron.

As heretofore noted, the price to be paid for muck mill rolling in the Eastern scale shall be one-sixth the price paid for boiling instead of one-seventh, as provided for by the Western scale. Notes two, three, four and five correspond respectively with notes two, three, four and six in the Western scale. Clause six does not appear in the Western scale and provides that roll hands on muck mills shall receive an average turn's work for changing rolls, except when change is caused by the changing of rolls.

The busheling on sand bottom scale provides for the payment of $1.90 per ton on a 1c selling base of bar iron, as compared with $2.20 in the Western scale, and when bar iron is selling at 2c the Eastern scale is $2.35 as compared with $2.65 of the Western. Footnotes one, two, three, four, five, six and seven correspond respectively to two, three, four, six, seven, nine and ten of the Western scale. Clause eight, which does not appear in the Western scale provides that when steel billets or solid iron is worked on sand bottom furnaces, the price paid shall be the same as scrap heating.

The Eastern bar mill scale follows: It is agreed that the following shall be the minimum or base price for 14-inch and bar mills, and that two percent additional for each one-tenth cent advance or decline on said card from one to two cent card rate shall be paid as per conference agreement.

ONE CENT BAR IRON.

	BASE PRICES.
Roller	$.296
Heater	.507
Heater's helper	.254
First rougher	.169
Second rougher	.169
Third rougher	.169
Catcher	.141

The Eastern scale for 10 and 12-in mills corresponds to the bar and 12-inch mill Western scale. The sliding scale is the same as in the Western scale, but the prices paid the roller, heater and others are considerably lower. On the 1 cent card rate the following prices per ton are paid:

	EASTERN SCALE BASE PRICE.	WESTERN SCALE BASE PRICE.
Roller	$.47	$.617
Heater	.507	.617
Helper	.254	
Rougher-up	.1875	
Catcher	.1775	
Rougher-down	.1875	
Third rougher	.1875	

Footnotes one, two, three, four, five, seven and eight correspond with notes one, six, eight, ten, eleven, fourteen and fifteen respectively of the Western scale. Note six of the Eastern scale provides that the night turn roller shall receive not less than ninety percent of the straight price for rolling, while in the Western mills the scale calls for not less than fifty percent.

Notes that do not appear in the Western scale follow:

Where spell or extra hands are required, conditions shall be arranged locally.

Roughers shall not hold rounds under three inches on bar mills. Spell-off shall help roller if necessary, above three inches.

That when heats are thrown out on account of breakage of mill or otherwise, furnace men shall be paid for the same when not the fault of the heater.

That on all heating furnaces there shall be a second helper, same to be paid by the company.

That all iron worked on 10 or 12-inch and bar mills shall be paid at the straight price.

The guide mill scale is as follows:

It is agreed that the base price at one cent card rate is based on the prices following for base sizes, with extra price for special sizes and with two percent additional for each one-tenth advance or decline on said card from one to two-cent card rate. The rollers, heaters, roughers and catchers shall each be paid by the company. It is understood, however, that this arrangement shall in no way detract from the authority of the roller in controlling all hands on mill including hiring and discharging, and as heretofore, the roller shall be held responsible for the work done.

BASE PRICES, ONE CENT BAR IRON.

Roller	$.564
Heater	.507
Heater's helper	.254
Rougher-up	.282
Catcher	.188
Stick-in	.170
Straighteners	.183
Rougher-down	.282

Footnotes one, two, three, four, six, seven and eight of this scale correspond respectively with notes five, six, twelve, thirteen, seventeen, eighteen and nineteen of the Western scale.

Note 5, which does not appear in the Western scale, provides that when working non-uniform billets such as cuttings, cobbles and scrap yard billets, five percent shall be added to the straight price of heaters, helpers and roll hands. This only to apply when average output is reduced one-sixth or more.

Other notes not in the Western scale are the following:

That when finished iron is not trimmed, not more than 5 percent shall be deducted for drop ends.

That on all 12-inch mills where all sizes are worked, guide mill prices shall be paid.

That one price be paid for nut and bar iron when not specified in the scale.

That the prices paid on breakdown mills be left to local conditions.

That roughers shall not work on stand rolls on guide mills.

The addenda are as follows:

That the amount of all sizes of iron and steel be placed in the weight book within a reasonable time, and placed where all men can see it.

On all finishing mills the last furnace shall not charge one hour later than the first furnace. On Saturday the first furnace shall cease charging at 10:30 a. m.

Where spell or extra hands are required, conditions shall be arranged locally.

That when a specialty of skelp is made, the price for finishing department should be made locally.

Scales for mills working skelp alone shall be arranged locally.

That company shall furnish sand and clay at furnace ready for use.

TIN PLATE SCALE CALLS FOR 5 PERCENT ADVANCES.

In recent announcements of the Amalgamated Association's proposed changes in the tin plate scale it was stated that no change in the sliding scale from the customary 2 percent was contemplated. Such, however, is not the case. Instead of asking for a 2 percent advance as heretofore for each advance above the base selling price of tin plate amounting to 10 cents a box, the workers demand an advance of 5 percent. Should they insist on forcing this proposal upon the manufacturers, all the union tin plate mills in the country will close on July 1. The manufacturers will not agree to this arrangement, and it was no doubt adopted by the tin workers to make up for the reduction of 10 percent below last year's scale which they agreed upon. At present they are working 18 percent below this scale and for each 10-cent advance in tin plate their scale provides for an advance of 2 percent. An advance of 20 cents a box would restore the 1903-4 scale, whereas under the present arrangement tin plate would have to advance 90 cents a box before this scale would be restored. The interesting provisions of the tin plate scale, which have been withheld up to the present, are as follows: "When a box of 100 pounds coke tin plates is selling at $3.40, the scale of prices as appears below shall be paid. On each 10-cent increase in the price per box, 5 percent advance on the prices below shall be paid; and on each 10 cents per box decrease, a deduction of 5 percent shall be made to said base. But it is understood that the wage list below is the minimum for the year ending June 30, 1905. Prices for rolling, doubling, heating, catching, shearing and screw boy to be 10 percent below prices of 1903-04 scale.

RIOTOUS STRIKERS AT HANGING ROCK, O.

The past week has been one of keen anxiety in the vicinity of the Hamilton furnace of the Hanging Rock Iron Co., Hanging Rock, O. Trouble between the striking furnace workers and non-union negroes culminated in the shooting of William Jeffreys, superintendent of the Hamilton furnace, but the wound did not prove serious. Governor Herrick ordered four companies of militia to the scene of the trouble. After the arrival of the soldiers there was no serious trouble and they were withdrawn Monday, June 6. Large quantities of ammunition and many firearms were taken away from the strikers and non-union men. The state board of arbitration has been endeavoring to arbitrate the differences between the company and its employes, but so far without success. D. B. Meacham, Rogers, Brown & Co.'s Cincinnati resident partner, who is president of the Hanging Rock Iron Co., made the following statement to a Cincinnati newspaper:

"The blast furnace owned by the Hanging Rock Iron Co., at Hanging Rock, O., on account of its condition, it having been in blast for more than three and a half years, was not producing its usual output of pig iron, and in consequence of this three men on each turn, whose services were not needed, were laid off early in April. Two days after a committee of the union notified the superintendent that unless the men were put at work they would all strike that night, and they did so. The furnace was then blown out. In order to make repairs about 20 non-union men were employed, who were put into the houses belonging to the company, and the necessary tearing out of the lining of the furnaces was begun. The non-union men have attended to their own affairs, and have given no cause for the attacks that have been made on them. The strikers have armed themselves, have made repeated attacks, and have done everything possible to keep away workmen of various kinds, and on yesterday attempted to assassinate the superintendent and the chief guard. As the local authorities were either unwilling or unable to control the situation the governor was appealed to for troops, which have been ordered to Hanging Rock. It is the intention of the Hanging Rock Co. to have the furnaces repaired as promptly as possible."

"What about the report of the non-union men being the aggressors?" was asked.

"That is not correct. We housed these men in our own houses, and they had to protect themselves with firearms. The statement that these difficulties would have been avoided if our men had put aside their guns is correct. None of them would have been alive today. It was a matter of self-protection. We are always compelled to import help, masons, bricklayers, etc., whenever we want to make repairs, and when the furnace began to decrease its output two months ago we thought the time a good one to make the necessary repairs. We laid off the men not needed; we did not discharge them. I presume we know how we want our business run."

THE STRIKE ON THE LAKES.

The events of the week in the strike of the members of the Masters' and Pilots' Association on the Great Lakes were the secession from the ranks of the union of a large number of its members; the attempting of a mob at Buffalo to prevent the propeller John T. Hutchinson from leaving that port; the failure of the effort of the Cleveland branch of the Civic Federation to bring about a settlement of the trouble; the affiliation of the Masters' and Pilots' Association with the Federation of Labor, and the starting of a number of boats with captains who had resigned from the union.

The timely intervention of a squad of police at Buffalo on the afternoon of June 5 probably saved the life of first mate Hugh McFadden, who was held in a house by a mob of over 600 angry strikers and sympathizers. The riot occurred at the West Shore docks, when an attempt was made to prevent the propeller John T. Hutchinson, which made the memorable trip down the lakes after the close of navigation last season, from leaving port. With the aid of the police, the Hutchinson succeeded in starting on its trip. This was the only act of violence of any importance during the week.

A committee of the Cleveland branch of the Civic Federation, after conferring with representatives of the Masters' and Pilots' Association and the Lake Carriers' Association, decided that it would be useless to make further effort to effect an agreement by arbitration.

After a considerable number of captains had forwarded their resignations to the union, officers of the union decided, as a last resort to prevent the complete collapse of the strike, to affiliate with the American Federation of Labor, the hope being that through the influence of the federation some of the unions which had made contracts with the Lake Carriers' Association would be induced to break their contracts and go out on a sympathetic strike. While this last act of the union officers complicates the situation somewhat, there is no prospect that it will succeed to any great extent. President Livingstone, of the Lake Carriers' Association, states that the contracts with other labor unions of the lakes prohibit sympathetic strikes, and he is confident that these contracts will not be broken. Mr. Penje, the chief officer of the Seamen's Union, has assured President Livingstone that existing contracts will be carried out. Mr. Livingstone says further:

"As to the unions with whom we have contracts, affiliated with the International Longshoremen, of which Mr. D. J. Keefe is president, past experience has taught us, and not only us, but all others who have had dealings with him, that if there is any one principle that he stands solid for more than another, it is carrying out of a contract rigidly after once entered into, on the principle that such contract is sacredly in-

violate, and his reputation is too well known to have the matter even questioned."

General Manager Coulby, of the Pittsburg Steamship Co., says that he is not at all worried about the unions carrying out their contracts. Captains are asking for their old jobs more rapidly than the boats can be started, but some trouble is being experienced in getting mates.

It developed Wednesday that there is grave doubt whether the so-called affiliation of the Masters' and Pilots' Association with the Federation of Labor is regular; in fact, the whole proceeding may be repudiated by the latter organization. It appears that one J. M. McGregor has dug up an old charter of an organization known as the International Pilots' Association, of which he is the only member. He proposes to "affiliate" all the members of the Masters' and Pilots' Association with himself and inaugurate sympathetic strikes. The vessel owners do not believe he will succeed.

Report of the Civic Federation.

At a meeting of the executive committee of the Cleveland Civic Federation held June 8, the committee appointed May 26 to investigate the deadlock between the Lake Carriers' Association and the Masters' and Pilots' Association submitted an extended report and was discharged as requested. One or two extracts from the report are of interest:

"The Lake Carriers' Association insist that the relation of a master to his ship is that of a general agent, with possibly the broadest powers known in the law of agency. They say he is the responsible representative of the ship and owner, with power, in case of necessity and unable to communicate with the owner, even to sell the cargo or the ship herself; for the proper exercise of whose judgment in this respect the owner is responsible, and his declaration or admission made during the term of his employment is binding upon the ship and owner to the fullest extent. They further say, and we quote from their printed statement submitted to us, that 'while, pursuant to the purposes of our association and in the interest of public service we have endeavored to deal with the Masters and Pilots' Association, we have, on fullest consideration, and as a result of our experience and of our attempts, reached the conclusion that it is impossible and contrary to all the necessities, to deal with the masters through an organization in which they are associated with subordinates who outnumber and can outvote them, and oath-bound to rules and provisions and regulations beyond and inconsistent with the rules prescribed by the government, and the full and fair performance of their duties to the ship and owner and to the public.'

"The Lake Carriers' Association give us to understand, however, that they would not only be willing to deal and make contracts with an association formed by the mates alone and another association formed by the masters alone, but that they would encourage and facilitate the organization of such unions or associations, as they believe the organization of such separate unions or associations would be along the lines of other separate and independent organizations pertaining to the lake commerce. The Masters and Pilots' Association, on the other hand, insist that there is no inconsistency or impropriety in the organization which they have formed consisting of both masters and mates.

"It is the opinion of the committee, based upon the information received by them during these various hearings, that growing out of the change which has been going on so rapidly which has resulted in the passing of the ownership of lake vessels from individual and private ownership to corporate and syndicate ownership, various abuses have crept in, of which the masters and mates had reasonable ground to complain. But we believe from the same evidence that many, if not all of those grievances, would be corrected and eradicated by the present management of the various lake fleets, and we think we have a right to believe, from statements made by the representatives of the Masters and Pilots' Association who appeared before us, that they also believe that many, if not most, of these grievances would be and will be corrected. We further report that, while the different associations are ostensibly divided upon a number of propositions, these differences could readily be disposed of and adjusted if the two contending parties could see their way clear towards meeting and negotiating these differences."

NATIONAL METAL TRADES ASSOCIATION.

CINCINNATI, June 6.—The monthly foremen's meeting of the Cincinnati Metal Trades Association will be held at the rooms of the association on Thursday evening, June 23. There will be a smoker and lunch at the close of the meeting.

The New York Metal Trades Association held a conference with the conciliation committee of the National Civic Federation on June 2. At this meeting representatives of the striking boilermakers were present, and the discussion was confined practically to the question of the open shop as opposed to the closed shop. At the request of the Civic Federation on the following day, Messrs. N. F. Palmer, M. K. Bowman, C. C. Cunningham and H. C. Hunter attended another meeting in the Civic Federation rooms. The boilermakers' committee stated they had no authority to modify the demand for the closed shop, and when this was reported to the New York Metal Trades Association the sentiment was unanimous that no compromise on the association's principles would be made. The customers of the New York Metal Trades Association members have promised full support, and many of them are holding back work, awaiting the convenience of the employers.

Boston still reports a great many men unemployed in all classes.

The patternmakers, who struck in St. Louis, in the shops of the Remmers Pattern Co. and Fulton Iron Works, have applied for re-instatement under the old conditions. No action was taken on the application at last account.

The Citizens' Industrial Association at St. Louis, whose secretary is Mr. Ferd Schwedtmann, formerly a member of the administrative council of the N. M. T. A., announces that it will publish an official journal. The organ will be called the *Citizens Industrial Exponent,* and will be a 24-page magazine devoted principally to the open shop propaganda and the organization of employers and citizens.

The Pittsburgh Manufacturers' Association reports that for the first time since the starting of its labor bureau, not a single call for help was received from the members during the week.

Up to last Saturday no request had been received from the machinists at Pittsburgh for a conference, nor has any announcement been made by the machinists as to what they intend to do at the expiration of the present agreement, which terminates on July 1. It will be recalled that some time ago the manufacturers notified both the machinists and molders that a considerable reduction in present wages would be expected after July 1.

The machinists of Youngstown, O., formerly employed in the shops of the William Tod Co. and the Lloyd-Booth Works of the United Engineering Co., have accepted a 4 percent reduction in wages, and have returned to work on that basis. This 4 percent is in addition to the 5 percent cut made last December.

Commissioner Du Brul and Secretary Wuest went to Chicago on Thursday night, June 2, and found matters in very good shape. The Chicago Metal Trades Association has decided to hold no more conferences, but is proceeding to fill the shops. Mr. Wuest will remain in personal charge of the N. M. T. A. interests in Chicago. Over 150 applications were received by the local association last week from Chicago machinists to go to work in the struck shops. The national association is sending into Chicago practically the whole crew of strike breakers at its disposal. In addition, the local bureaus have been requisitioned for all the help they can supply. Besides these preparations the N. M. T. A. is sending men to different cities to pick up non-union men and take them to Chicago. The Chicago Metal Trades Association had information that a wrecking crew of union men under orders of District No. 8, of the I. A. of M., were being sent to take employment in the struck shops with the avowed purpose of damaging the machinery and tools. Both the local and national members are holding daily meetings, and every precaution is being taken to prevent the wrecking as well as to apprehend and convict the wreckers.

Commissioner Du Brul on his retirement from the official position which he now occupies with the N. M. T. A., will take up the organization of a cement manufacturing company. He has bought a tract of land in Jackson county, Ohio, which has the exceptional advantage of having the lime stone, shale, and coal in large quantities on the same piece of ground. Two railroads now tap the tract and a third line is projected through the property. Perhaps no other work in the United States will possess the natural advantages embodied in this location. The materials are all of high quality and the preliminary plans show a most economical arrangement for manufacture. The plant will be of 1,000 barrels capacity, with a possible extension of 2,000 barrels. It is anticipated that the company will soon be in the market for a full equipment of engines, boilers, dynamos and motors, crushers, kilns, pulverizing machinery and elevating and conveying machinery.

LABOR NOTES.

Nearly 2,000 men are idle at Sydney, N. S., on account of the general strike of employes of the Dominion Iron & Steel Co. All departments, with the exception of the coke oven plant and the electric power station, are shut down. The struggle between the men, who demand the restoration of last year's wage schedule, and the company, promises to be one of the most bitter in the history of Nova Scotian industries. Last October the men's wages were cut from 15 to 33 percent. The company is said to be well prepared for a long struggle. It is stated on behalf of the company that the business is in no condition to warrant an advance in wages at this time. The $200,000 semi-annual interest on $8,000,000 of bonds will be due in July.

The strikes among the workmen employed in the structural iron plants in New Haven, Bridgeport, Derby and Hartford have been ended. The demand of the employes for 50 cents instead of 45 cents per hour having been granted. The settlement of these strikes ends the trouble with the iron workers throughout Connecticut.

The foundrymen in the Youngstown, O., district have notified the molders in their employ that they wish to terminate the present agreement on July 1.

The machinists employed in the International Harvester Works, at Hamilton, Ont., threatened to strike because a machinist is required to run two milling machines instead of one. About 125 men will be affected.

Every building in Cincinnati in which plumbing work is going on carries a large placard offering $100 reward on the part of the employers association for the arrest and conviction of any parties damaging the plumbing. No less than four cases of such vandalism occurred during the past week, causing damage ranging from $250 to $1,500. A plumbers' strike has been on in Cincinnati since last November.

The labor controversy in the works of the Fore River Ship & Engine Co., Quincy, Mass., is approaching a settlement. The boiler makers and riveters have returned to work and all the employes of the company, except the shipwrights, have consented to resume their labor. The shipwrights will refuse to accede to the agreement signed by all the other men, by which the 55-hour scale is to be continued through the summer, to be superseded by a 54-hour scale next winter.

The bar iron conference to arrange a scale for 1904-05 between the Western manufacturers and the committee appointed by the Amalgamated Association, opened on Tuesday, June 7, at the Hotel Rider, Cambridge Springs, Pa. From present indications the conference will be protracted, as the manufacturers will insist on lower wages, while the association demands the same scale as last year, with new foot notes which would make the rate of wages higher than paid in the past year.

Pittsburg Seamless Tube Co.

Emil Winter and others connected with the Pittsburg Steel Co., Pittsburg, who are promoting the Pittsburg Seamless Tube Co., will shortly return from Dusseldorf, Germany, where they have been for several years closing for the American rights of the Briede patents for seamless tube manufacture. Patents on this method were allowed several months ago, and a successful experimental plant is in operation in Dusseldorf. The Pittsburg Seamless Tube Co. has secured a site for its plant at Monessen, Pa., and upon the return of the officers now abroad the work of erecting the plant will proceed.

American Foundrymen's Association at Indianapolis.

The eighth annual meeting of the American Foundrymen's Association opened in the assembly hall of the Claypool Hotel, Indianapolis, Ind., Tuesday afternoon, June 7, at 2:30, with an attendance of about 150, made up of members, foundry foremen, visitors and guests. Addresses of welcome were delivered by the mayor of Indianapolis, Hon. John W. Holtzman, and by the president of the local Commercial Club, John W. Kern, with an invocation by the Rev. Joshua Stansfield. The opening session was given over to the address of President Willis Brown and to the reading of reports from the secretary and treasurer, the committee on the standardizing bureau, committee on foundry trade schools, committee on insuring patterns, committee on instruction papers, secretary of foundry foremen's section, and secretary of metallurgists' section. There was also the presentation of standard specifications for pig iron and the reading of memorials on "Standard Methods for Measuring the Hardness of Molds" and on "Standard Specifications for Foundry Coke."

Mayor Holtzman in his speech said that it gave him such great pleasure to welcome the association to Indianapolis because its aims were along educational lines; that beyond merely considering the selfish interests of the foundry industry the association sought to promote the welfare of those who were identified as workers in that calling. He admitted being greatly surprised and considerably chagrined that the city of Indianapolis had no representation in the society's membership and expressed the hope that all the local firms operating foundries would take the proper steps to correct this omission, adding that it was the duty of all who employed labor to assist in the work of uplifting those in their employ, both mentally and socially. "There used to be a time," continued Mr. Holtzman, "when manufacturers took but little interest in those employed, beyond seeing that the work was done, but I am glad to say that the day has come when the employer feels that those who work for him are entitled to consideration beyond the mere question of dollars and cents, and that the man's conduct outside of the factory, in other words, his moral welfare, must be looked after if you hope to get the best results in your shops. And I want to say for the manufacturers of the city of Indianapolis, that they have for some years so conducted their shops that they are eligible to membership in your association in the fullest sense of the word and I hope they will join you, that there may be full and complete cooperation in this great work which you have undertaken and in which they can so ably assist you."

Mr. Kern's address was devoted to a description of the manufacturing facilities of Indianapolis and its advantageous location as a manufacturing center.

President's Address.

President Brown's address was warmly received. It reviewed the results and changes of the year since the meeting in Milwaukee, not only with regard to association matters, but as to the condition of the foundry industry and the labor situation. He said in part: "These annual conferences are surely worth all they cost, and in the interchange of thought, sentiment, impression and opinion cannot otherwise than be of educational value to all present. Some members content themselves by reading the published proceedings, but that process is sadly wanting in much that goes to make up the value of our meetings. Of more value than the printed words is the privilege of looking into each other's eyes, the friendly grasp of hands and the volumes of thought exchanged which never reaches the pages of the proceedings. The member must be dull, indeed, who goes from our meetings without taking with him new thoughts, new ideas and new inspirations for improvement in methods and policy in shop and office.

"I wish to congratulate our association on the benevolent assimilation of the foundry foremen's section, and to express the belief that the benefits have been quite as great to our association as they have been to the foremen's association. It is to be hoped that this idea of bringing office and shop into closer touch will be carried ahead and favored by a like membership from other branches kindred to our association.

"Along the lines of foundry practice, great progress has

been made recently and largely under the auspices of our association. But a few years since pig iron was graded, sold and bought by fracture, and by the physical appearance presented to the keen-eyed experienced pig iron man. Now a large portion of pig iron is graded by analysis, and a much larger portion is brought and melted by analysis, and no one who has had practical experience along these lines will say that it is not a step in progress. Is it not possible that under the advice of some leaders in thought along the business ends of our affairs, reforms and improvements may be instituted in the buying of materials and selling the product which would be to the advantage of the American foundryman.

"From the number and variety of molding machines which have been perfected and introduced within the past few years, it is evident that the industry is entering a period of rapid progress in this direction, and we believe that it will repay every member of this association to give the molding machine his early and earnest attention."

Secretary's Report.

The report of the secretary, Dr. Richard Moldenke, of New York, is as follows:

This has been a year in which labor movements have almost wholly monopolized the attention of the foundry industry. The educational side has naturally suffered correspondingly in the support that should have come to it. As a consequence we have to record a retrogression on the part of our membership and finances, but fortunately not in the standing of the association and its influence in the councils of American Industry.

Perhaps the most important thing accomplished during the past year was the drawing up of a series of specifications for pig iron, cast iron and finished castings. These specifications are before you today for discussion. They were prepared under the direction of a committee of the best known men in our industry, nearly all members of our association, and our own and the furnace interests united under the auspices of the American Society for Testing Materials. This marks the first distinct step which gives the benefit of science, already well applied in the foundry, to the commercial side of our work. It will always be counted to our credit as foundrymen that we were the first to work for a good set of specifications, even though we knew that it meant toeing the mark afterward, and to our persistent efforts can this accomplished fact be traced.

We will take up today another important matter, which can be made to be of incalculable benefit to the iron and steel trade, and that is the standardizing of coke. We naturally will confine ourselves to foundry coke, but the whole iron industry is looking for some definite commercial basis upon which the good, indifferent and bad cokes can be handled for the best interests of all concerned.

Your officers have been active in various enterprises along educational lines, in the conventions of other associations taking up cast iron as a study, and on committees of national and international character. Your members have assisted in the foundry end of the international dictionary of technical terms now being gotten up in Germany, and today the American Foundrymen's Association is held up as a model educational foundry association to be patterned after in other countries. All this has meant effort on the part of our members, but the results obtained for the industry are well worth striving for. Standardization of method, system in the shop, harmony between the various crafts grouped about the commercial production of castings, and finally the finesse in management which has made our country take the first industrial position of the world—all these combined has been the trend of our ambition, and we are steadily gaining as we learn how to grasp the fruits of American ideas and perseverance and apply them to the foundry.

This work, however, is that of the few in the association, not the many. You will receive the committee reports, and among them that on instruction papers. It is a peculiar commentary on our ideas of progress that not one foundry owner has ordered a supply of those instruction papers for distribution among his men. Our foremen's association, however, has done this for the apprentices under their charge as individuals, and foreign employers have sent for large lots, as they appreciate the value of trained men, and know that some one must do the training.

Pursuant to your resolution last year, the *Journal* of the association has been greatly enlarged and a staff of experts added as associate editors. The new *Journal* was widely distributed, not only to gain support for the association but also to give the advertisers their proper equivalent. The result was entirely unsatisfactory, and I can only advise that we leave the field of trade journalism, which this effort really amounted to, and confine ourselves strictly to the regular transactions, the work of committees, and the usual functions of an association of men looking for results by the interchange of ideas and experiences. While the liabilities thus created must first be liquidated, the cutting off of much of the printing expense will enable the expense to be kept down, and I would recommend an eventual reduction of the dues to a fairly low figure, so that the membership may be increased and the value of the work done enhanced. All the losses we have sustained in the membership are directly due to the heavy expense entailed by the defense movement. The characteristic reply to my letters asking reconsideration in the case of a resignation invariably is: "We think you are doing splendid work, but the calls for defense are necessitating the cutting off of everything not directly connected with the turning over of the dollar." And yet there is the cry for better and more molders and for efficient foremen and managers.

The present membership of the association is 278. The financial accounts for the year are as follows:

RECEIPTS.

From dues, sales, advertisements, etc.	$2,469 99
From standardizing bureau	263 32
Balance for 1903	59 42

EXPENDITURES.

Journal		$1,723 15
Printing		160 60
Salaries		400 00
Postage		219 00
Sundries		35 00
Standardizing bureau		229 22
Balance for 1904		25 76
	$2,792 73	$2,792 73

Collections were pretty close, though some $125 is still outstanding. There are, however, unpaid bills amounting to $988.16, distributed as follows: Journal, $206.31; printing, $16.85; salaries, $700; postage, $47; standardizing bureau, $18. This would make a deficit of about $870 for the past year.

While it is necessarily discouraging to see the trend of thought go almost entirely in the direction of defense against labor aggression, yet this will eventually adjust itself on a basis which leaves something to the foundryman to expend in securing himself beyond his immediate necessities. We need therefore only let the forces of circumstances act, and simply face the music.

Visit to the Atlas Engine Works.

Tuesday forenoon the members and their friends visited the works of the Atlas Engine Co., three trolley cars and a brass band having been arranged for by the local committee to escort the visitors to the works. Every courtesy was extended for a thorough inspection of the plant, the foundrymen being much interested, especially in the use of large molding machines of the company's own manufacture, and in the special melting equipment, which has heretofore been described in the columns of *The Iron Trade Review*.

Foundry Foremen's Meeting.

The Associated Foundry Foremen held their second annual meeting Monday evening in the Masonic Hall, with about 75 members present. Owing to the absence of Secretary J. A. Murphy but little routine work was done. The president, C. H. Thomas, of Newark, N. J., suggested the appointment of a committee of five to consider certain proposed amendments to the constitution. This was carried and a committee appointed consisting of the following: President Thomas, chairman; William F. Grunau, Erie, Pa.; David Reid, Columbus, O.; A. W. Link, Erie, Pa.; Thomas Glasscock, Milwaukee; and William Holmes, Indianapolis. The amendments are for the purpose of making more clear the duties of the secretaries of the various local branches of the association, as well as to provide for a system of sick benefits for members.

A feature of the session was a paper by F. C. Everitt, of the J. L. Mott Iron Works, New York City, on "Carbon,"

which provoked considerable discussion. Another meeting of the association will be held Thursday, at which national officers for the ensuing year will be elected.

Several local foreman patternmakers, as well as some from out of town, including Wm. H. Parry, of the National Motor Co., Brooklyn, N. Y., attended the afternoon and evening sessions of the convention on Tuesday and it is proposed before the convention closes to organize a patternmakers' section with those in attendance as a nucleus, along lines similar to the foundry foremen's organization.

Tuesday Evening.

The paper prepared by Thomas D. West, Sharpsville, Pa., on "Standard Systems for Making Green Sand Beds" was read at the afternoon session. At the evening session, an address was made by George H. Hull, of New York, on the "Pig Iron Warrant System as Applicable to the Foundry," which aroused considerable interest and discussion. Other papers that were brought before the association in the course of the evening were the following: "Molding Machines, Their Uses," by E. H. Mumford, Tabor Mfg. Co., Philadelphia; "Moisture in Molding Sand," by W. S. Morehouse, New York City; "Cupola Fan Practice," by W. H. Carrier, Buffalo.

Wednesday's Session.

(Special Telegram.)

Indianapolis, June 8.—As a special order of business the motion made yesterday by H. E. Field of Pittsburg, to make two changes in the proposed standard specification for foundry pig iron, was taken up and discussed immediately after the opening of today's session. These provided for a change in the paragraphs relating to "Sampling" and to "Allowances and Penalties." The meeting was then turned over to the foundry foremen's section. This evening a smoker will be given by the Commercial Club in the assembly hall of the hotel. About thirty additional members and visitors have registered since yesterday.

Those in Attendance.

The following had registered up to a late hour Tuesday afternoon:

James A. Murphy, Lane & Bodley Co., Cincinnati.
Frank J. Berchtold, Erie Engine Works, Erie, Pa.
John Magee, Magee Furnace Co., Boston, Mass.
S. H. Fisher, Harrisburg Foundry & Machine Works, Harrisburg, Pa.
Wm. F. Grunan, Erie City Iron Works, Erie, Pa.
A. P. Hanrath, Altoona Foundry Co., Altoona, Pa.
Wm. Chambers, C. S. McNeal, Garden City Sand Co., Chicago.
R. E. Turnbull, D. F. Eagan, E. S. Pridmore, Henry E. Pridmore, Chicago.
Henry E. Pridmore, Chicago.
Wm. M. Fitzpatrick, S. Obermayer Co., Pittsburg.
S. T. Johnston, S. Obermayer Co., Chicago.
W. J. Adams, S. Obermayer Co., Milwaukee, Wis.
Justus Thorner, S. Obermayer Co., Cincinnati.
John R. Hayeskie, International Harvester Co., Chicago.
A. M. Ott, International Harvester Co. (Plano Works.)
Philip Wittlinger, International Harvester Co. (Deering Works.)
John O'Donnell, International Harvester Co. (McCormick Works.)
Edward Riley, International Harvester Co. (Milwaukee Works.)
Wm. Yagle, Yagle Foundry & Machine Co., Pittsburg.
W. H. McFadden, N. E. Field, McIntosh, Hemphill & Co., Pittsburg.
D. J. Thomas, Stewart Thomas Foundry Co., Pittsburg.
G. C. Schade, George England, Braddock Machine & Mfg. Co., Pittsburg.
J. S. Seaman, E. Wentz, Seaman, Sleeth Co., Pittsburg.
Harry McEwan, A. Garrison Foundry Co., Pittsburg.
C. O. Jones, Rosedale Foundry Co., Pittsburg.
S. D. Sleeth, H. C. Lauderbach, Westinghouse Air Brake Co., Pittsburg.
A. W. Slocum, National Car Wheel Co., Pittsburg.
F. E. Malone, J. S. McCormick, W. M. Wilson, J. S. McCormick Co., Pittsburg.
R. F. Barker, Taylor, Wilson & Co., Pittsburg.
F. M. Zimmers, Union Foundry & Machine Co., Pittsburg.
H. M. Lane, *The Foundry* and *The Patternmaker*, Cleveland.
R. R. Shuman, *Iron Age*, Chicago.
George H. Griffiths, *The Iron Trade Review*, Chicago.
David Spence, Greenlee Foundry Co., Chicago.
David Reid, Columbus, O.
J. Frank Dye, Newport Sand Bank Co., Newport, Ky.
J. J. Reardon, Bullock Electric Co., Cincinnati, O.
Thos. Glasscock, Pawling & Harnischfeger, Milwaukee, Wis.
M. F. Richardson, Kalamazoo, Mich.
Geo. F. Crivel, F. B. Stevens, Detroit, Mich.
Chris. J. Wolff, L. Wolff Mfg. Co., Chicago.
John P. O'Neil, John Walters, Western Foundry Co., Chicago.
Edward B. Gilmour, Cook Heater Co., Peoria, Ill.
William W. Hutton, Advance Thresher Co., Battle Creek, Mich.
Thos. Robertson, Gould Mfg. Co., Seneca Falls, N. Y.
Wm. H. Gartside, Diamond Clamp & Flask Co., Richmond, Ind.
P. M. Wooden, Reeves & Co., Columbus, Ind.
Milton J. Moore, Illinois Steel Co., Joliet, Ill.
John C. Kneppel, Ames Iron Works, Oswego, N. Y.
Augustus T. Williams, Philadelphia.
E. G. Crawford, Carondelet Foundry Co., St. Louis, Mo.
Thomas D. West, Sharpsville, Pa.
C. J. Wiltshire, Allis-Chalmers Co., Chicago.
E. E. Hanna, Hanna Engineering Works, Chicago.
A. M. Thompson, Link-Belt Machinery Co., Chicago.
E. J. Woodison, Detroit Foundry Supply Co., Detroit, Mich.
Robert Field, C. J. Burton, Field-Evans Iron Co., Cincinnati, O.
David Evans, Field-Evans Iron Co., Chicago.
W. A. Keller, Hetherington & Berrier, Cincinnati.
J. W. Sturgeon, Chandler & Taylor Co., Indianapolis, Ind.
C. H. Thomas, Hay Foundry & Iron Works, Newark, N. J.
H. S. Bell, Dodge Mfg. Co., Mishawaka, Ind.
F. P. Howlett, Dodge Mfg. Co., Mishawaka, Ind.
A. K. Beckwith, P. D. Beckwith Estate, Dowagiac, Mich.
F. C. Everett, J. L. Mott Iron Works, New York City.
E. J. Lyon, Brown & Sharpe Mfg. Co., Providence, R. I.
Walter J. Kohler, J. M. Kohler & Son Co., Sheboygan, Wis.
J. P. Golden, Columbus, Ga.
George J. Hessler, E. A. Hessler, Syracuse Foundry Co., Syracuse, N. Y.
H. L. Williams, Hickman, Williams & Co., Chicago.
Ben. P. Williams, Hickman, Williams & Co., St. Louis, Mo.
R. B. Hickman, Hickman, Williams & Co., Louisville, Ky.
F. M. Eaton, Hickman, Williams & Co., Cincinnati.
Fred. J. Brunner, Cincinnati.
Ed. Fakey, Cleveland.
John D. Ormrod, Emmalls, Pa.
C. E. McArthur, Western Electric Co., Chicago.
George H. Wadsworth, Falls Rivet & Machine Co., Cuyahoga Falls, O.
Thomas S. Bullock, Philadelphia Pneumatic Tool Co., Philadelphia.
Henry S. Potter, Pneumatic Engineering Co., London, Eng.
Hermann Barrett, Ridgway, Pa.
T. A. Lovelle, Lovelle Foundry Co., Anderson, Ind.
J. Hill, J. M. Glass, Hill & Griffith Co., Cincinnati.
A. G. Hollingshead, Philadelphia Pneumatic Tool Co., Philadelphia.
Thad. L. Farnham, Whiting Foundry Equipment Co., Harvey, Ill.
Wm. H. Parry, National Meter Co., Brooklyn, N. Y.
Robert Blyth, Walker, Piatt Mfg. Co., Boston, Mass.
J. P. Winlock, Barbour & Stockwell, Cambridge, Mass.
F. H. Chamberlain, P. Smith, Ed. Garland, J. Smith, J. D. Smith Foundry Supply Co., Cleveland.
Willis Brown, Erie, Pa.
Edgar W. Anthony, Edgar W. Anthony Jr., W. C. Skulley, Smith & Anthony Co., Boston, Mass.
Dr. R. Moldenke, New York City.
Charles Bretzman, Indianapolis, Ind.
Thomas N. Burnman, Shurley Radiator & Foundry Co., Indianapolis, Ind.
U. E. Kanavel, Ayers Mineral Co., Zanesville, O.
F. E. Gordon, Ohio Sand Co., Conneaut, O.
Frank Eiter, Grimes Foundry & Machine Co., Bluffton, Ind.
Fred. W. Bauer, Rogers, Brown & Co., Cincinnati.
F. B. Osborne, Louisville, Ky.
E. M. Drummond, Louisville, Ky.
W. D. Trabue, Phillips & Buttorff Mfg. Co., Nashville, Tenn.
J. J. Burger, Lane Mfg. Co., Montpelier, Vt.
John W. Burr, Burr & Houston Co., Brooklyn, N. Y.
Nat'l H. McPhee, Ansonia, Conn.
T. L. Griffith, T. P. Kelly & Co., New York City.
F. W. Shryer, Bloomfield Mfg. Co., Bloomfield, Ind.
Edward E. Barbier, Milwaukee, Wis.
Arch. M. Loudon, Abendroth Bros., Port Chester, N. Y.
George H. Hull Sr., and George H. Hull Jr., American Pig Iron Storage Warrant Co., New York.
John McLaren, Phillips & McLaren, Pittsburg.

Local Committees.

The local entertainment committee is made up from the members of the Commercial Club, being assisted by the officers of the Indianapolis Foundry Foremen's Association. The Commercial Club committee consists of W. M. Taylor, chairman, Hugh R. Richards and Lewis Hoover. The foundry foremen's committee is as follows: William Balmer, Brown-Ketcham Iron Works; W. H. Holmes, American Foundry Co.; William Keller, Hetherington-Berner Co.; John Reynolds, Enterprise Foundry Co.

The finance committee of the Commercial Club is composed of D. M. Parry, president of the National Association of Manufacturers, chairman; J. I. Dissette, secretary-treasurer of the Indianapolis Foundry Co.; L. C. Huseman, president of the Central Supply Co., plumbing jobbers; R. B. Hilleary, secretary-manager of the Pneumatic Elevator & Weigher Co.; W. M. Taylor of the Chandler & Taylor Engine Co.; George Vonnegut, of the Vonnegut Hardware Co., and John S. Farrell, president of J. S. Farrell & Co., plumbers. Frank S. Fishback, president of the Fishback Warehouse Co., is charman of the committee on entertainment. Charles A. Bookwalter, ex-mayor, is president of the executive committee.

The J. R. Vandyck Co., of New York, has just secured the order for entire equipment for the new shop of Zeh & Hahnemann, of Newark, N. J., consisting of Whitcomb planer, Bradford lathes, Fosdick radial drill, Milwaukee milling machine, Queen City shaper, speed lathes, grinders, drill presses, band saw, cold saw, trimmers and small tools.

"South African Rock Drill Tests" is a leaflet just published by the Rand Drill Co. It is a fac-simile reproduction of a page taken from the Johannesburg *Star*, and contains an account of the now famous drill tests carried on by the Engineers' Association of the Witwatersrand. The verbatim report of the engineers finds for the drills of American make.

At a meeting of the creditors of the Georgia Car & Mfg. Co., Savannah, Ga., the Savannah Trust Co. was selected as trustee.

Steam Boiler Insurance.

Through the courtesy of *Yale Alumni Weekly* we submit some extracts from a copyrighted lecture in the Yale Insurance Course, by A. D. Risteen, Ph. D., of the Hartford Steam Boiler Inspection & Insurance Co., of Hartford, Conn. The original intention was that the address should be given by J. M. Allen, who was for 37 years the president of the company, and who was undoubtedly the foremost authority upon the subject. It was he who first demonstrated the possibilities of steam boiler insurance on the large scale; and the success that ultimately crowned his efforts were won by hard, uphill work, against prejudice and even ridicule, that would have disheartened a man with a less positive conviction. He died on December 28, and by his death Hartford lost a liberal-minded, public-spirited citizen; and insurance circles lost an underwriter who had won universal esteem and confidence.

"In the first place, we may fairly ask ourselves, 'Is there a legitimate field for boiler insurance?' We know that there are such fields for life, casualty, fire, marine and indemnity insurance; for we know that all men must die, and we know that many of them meet with accidents; and we know that houses burn up, and that ships sink in the sea, and that men in responsible positions are not invariably true to their trusts. But do boilers actually explode and destroy lives and property? And if they do, is the chance that any given boiler will explode great enough to warrant placing it under insurance?

"Do boilers explode? By way of a general reply to this question, I would say that during the period between Jan. 1, 1879, and Jan. 1, 1903, the Hartford Steam Boiler Inspection & Insurance Co. has recorded no less than 6,386 boiler explosions. There can be no doubt that this list is very incomplete; but it is the best that can be had. By these 6,386 boiler explosions, 7,002 persons were killed, and 10,346 others were more or less seriously injured; so that the total number of persons killed and injured by boiler explosions during this period was at least 17,348. Many a city has a population not materially greater than this.

Cause of Explosions.

"Even among those who admit that boilers explode, there appears to be a sort of mania for attributing all of the explosions to one single cause, low water. You can hardly pick up a newspaper containing an account of such an explosion, without reading about the negligence of the attendant, in permitting the water to get too low; and I have even known of attempts being made to lynch him, when the explosion has been attended by serious loss of life; and yet I am confident that in many of these cases the poor fellow had been as efficient and as careful as his experience and his intelligence would permit. About the only variation from the low water theory that is commonly encountered, is the 'mysterious gas' theory, which attributes the disastrous results to some kind of a gas, known or unknown, which is assumed to have been generated so abundantly and so suddenly as to disrupt the steel of which the boiler was composed. I think the gas theory may be dismissed without further comment; but the low water theory requires passing notice. There can be no doubt that boilers do explode from low water, but in connection with this admission I wish to point out two things. First, that low water is not by any means the only cause; and second, that when an explosion really is due to low water it is not likely to be a very disastrous one. When a boiler explodes, it does so merely because it is not strong enough to withstand the pressure that is within it; and any cause whatsoever which renders it incapable of sustaining that pressure is bound to produce an explosion, or, at least, a rupture. It appears that this fact is simple enough to be admitted by anyone; but you will find that its truth is not universally recognized, and that most men prefer 'spheroidal theories' and 'red gases' and other improbable things, to this very obvious explanation.

"My statement that a low water explosion is likely to be less disastrous than an explosion attended by a plentiful supply of water is based upon the fact that the energy contained in a cubic foot of steam is far less than that contained in a cubic foot of water at the same temperature. Pound for pound, steam contains the more energy; but cubic foot for cubic foot, the balance is very largely indeed in favor of the water. And in comparing the explosive energies of two similar boilers, one of which is filled with steam and the other with water at the same temperature, it is the capacity of the boilers in cubic feet that must be considered, rather than the weights or their contents. If you are desirous of pursuing this phase of the question further, I would refer you to Professor R. H. Thurston's little work on 'Steam Boiler Explosions,' where the subject is considered in detail.

"The idea of insuring steam boilers for substantial amounts originated in Hartford (so far as I know), about the year 1857. The Steam Users' Association of Manchester, England, was already organized in England, with the object of preventing boiler explosions by means of periodical inspections. Under the system as started there, the manufacturer paid a certain sum annually for the examinations, receiving in return either a certificate of the safe condition of his boilers or a report condemning them; but the certificate, like those issued in some parts of this country by direct appointees of the State, involved no pecuniary obligation on the part of the association, and while it relieved the holder from the charge of carelessness in case of disaster, it entitled him to no indemnity. In 1857 a number of young men in Hartford, drawn together by similarity of tastes, organized the Polytechnic Club with the view, primarily, of investigating and discussing questions of science in relation to the utilities of practical life. Although the membership of this club was small, it included such men as Francis A. Pratt, Amos W. Whitney, J. M. Allen and Prof. C. B. Richards. I suspect that the attention of the club was first directed to boiler insurance by the destruction of the car factory of Fales & Gray by a boiler explosion on March 2, 1854. The factory was located on the Connecticut river, at the foot of Potter street, in Hartford, and the explosion was one of great force. Whether this was the origin of the idea or not, it is certain that the Polytechnic Club evolved the plan of combining a substantial guarantee with the inspection, thus giving both parties to the contract a pecuniary interest in the safety of the boiler. Owing to the intervention of the Civil War, nothing was done in the way of materializing this idea until 1866, when the Hartford Steam Boiler Inspection & Insurance Co. was organized and incorporated under the laws of Connecticut. The company was therefore the first company in the world to engage in the business of boiler insurance, in such a way as to provide substantial indemnity in the case of loss by explosion or rupture. Its growth has been rapid, and while there are several other companies now engaged in the business, the Hartford Co. is still by far the largest company in the world which devotes its entire attention to the subject of boiler insurance.

Prevention of Boiler Explosions.

"In boiler insurance the fundamental object ought to be, to prevent explosions so far as possible. The life insurance companies cannot guard themselves in this manner, save in the most general way. The fire companies can do much more, and they do aim to prevent fires so far as possible by a system of inspection which is designed to detect and remove special sources of danger. The boiler insurance companies can go even further in this direction, however, and experience has shown that it is possible, by thorough inspection, to prevent explosions in a very large measure. Prevention, then, is the key note of successful boiler insurance; and a very large proportion of the income of a boiler insurance company is expended in the making of inspections, and in other similar services to the assured, which tend to lessen the likelihood of an explosion. The Hartford Co. maintains a chemical laboratory, for example, in which troublesome feed waters are analyzed, and appropriate methods discovered for the treatment of these waters, so that they may be used successfully in the boilers in which they have been found to give trouble. The Hartford Co. also maintains a department of design, in which plans and specifications for boilers and boiler settings are prepared for the assured, no charge being made for these unless the labor involved is considerable; and in that case the charge is merely nominal, and is intended simply to cover the actual expense to which the insurance company is put.

"I imagine that you will want to know something about the way in which the premiums that are received by the boiler insurance companies are expended. I cannot answer this for others, but so far as the Hartford Co. is concerned, it may be said that the premium receipts are divisible into a maximum portion of about 90 percent of the whole, and a minimum portion of about 10 percent; the 10 percent representing, roughly, the amount that may be regarded as set aside to provide for the payment of losses due to explosions, while the 90 percent represents what is expended in procuring the risks, and in inspecting them with such care as to prevent the 10 percent from being drawn upon. I am not authoritatively informed as to the percentage that other companies have found it necessary to reserve for the payment of losses; but, as I have said, the experience of the Hartford Co. indicates that it is good business to expend a very large portion of the total premiums upon the making of inspections; an expenditure of 90 percent making it possible to more than cover the actual losses by the 10 percent fraction remaining.

Conducting the Business.

"The boiler owner being assumed to be persuaded of the wisdom of taking out a policy, the next questions to be determined are these: (1st) The term, or duration, of the policy. (2d) The amount for which it shall be written. (3d) The premium that shall be paid. First, as to the term of the policy. This happens to be a very simple matter, for nearly all boiler insurance policies are written for three years, and it is only under exceptional circumstances that this practice is modified. I may as well explain, once for all, that what I shall have to say relates to the great mass of the business of the company with which I am connected; and it is to be understood throughout that when a statement is made, it merely represents this general practice. Reasonable persons may nearly always be expected to do reasonable things; and boiler insurance companies are always willing to take account of any exceptional conditions that a given case may present, and to modify their practice accordingly—provided the proposed modification does not interfere with the desirability of the risk. The general rule of the busness is, then, to write policies for three years.

"Second, as to the amount for which the policy is to be written. This problem and the third one, namely, the amount of the premium, are intimately connected. For it is evident that the total amount of the premium must be sufficient to repay the insurance company for the expenses incurred in obtaining the risk, and for those incurred in inspecting the boiler periodically while it is insured; and there must also be an excess, over and above these sums, to be set aside for the payment of such losses as may be incurred by explosion. In the early days, it was customary to fix the rate to be charged by means of a sort of sliding scale, the rate being higher for high pressures than for low ones, and higher for boilers that had been in service for some time than for those that were just out of the maker's shop. At the present time, however, it is not the practice to vary the rate in this manner; and the great bulk of the business is now written at a uniform rate of 1 percent for the three years, provided the face of the policy is great enough for this rate to yield a premium sufficient to cover the three items just noted —that is, the expense of obtaining the risk, of inspecting it periodically, and of insuring it. It is not profitable to insure isolated boilers at this rate for a smaller sum than $5,000 each; the rate of 1 percent for three years yielding, in this case, the sum of $50 for the three years, or an average premium of $16.67 per annum.

"In large plants, where there are many boilers, a smaller sum than $5,000 per boiler may be sufficient; for in such plants the inspectors can usually arrange to examine several boilers on each trip, and thus reduce the expense of inspection per boiler. A battery of ten boilers, for example, might reasonably be insured for $40,000, at a rate of 1 percent for three years; this yielding a total premium for the three years of $400, which is at the rate of $133⅓ per annum for the ten boilers. The business should be good at this figure, if several of the boilers can be had for inspection at the same time, and if the plant is not too far removed from the ordinary routes of travel. In general, therefore, the face of the policy is computed by allowing, for each boiler in the plant, something like $5,000 if the plant is a small one, or somewhat less than this if it is a large one; and the total premium to be paid for the three years that the policy is to run is then computed by taking 1 percent of the face of the policy as so determined. It will be readily understood that when the risk is of an unusual character, this general rule has to be modified accordingly. For example, a single high-pressure boiler, bursting in the basement of a factory whose product or machinery is especially valuable, might easily do far more than $5,000 of damage; and if numerous workmen were employed in parts of the building near to the boiler, the likelihood of a considerable loss of life and personal injury would have to be specially considered. The fact of the policy would then naturally be increased, so as to take account of the probable gravity of the results of an explosion. The rate charged for the insurance would not ordinarily be raised in such a case, however; for the standard rate of 1 percent for three years would yield a larger gross premium, and the expenses of solicitation and inspection being fixed, it is evident that that part of the premium which would be available for the payment of losses would be proportionately greater with the large premium than with the smaller one; and the insurance company therefore has a larger proportionate sum that can be set aside to provide for the increased possibility of a serious explosion.

Extra Hazardous Risks.

"I cannot emphasize too strongly the fact that there is no rate at which a boiler is insurable, when there is any reason to doubt its safety. In fire insurance an extra hazardous risk may be provided for by an increase in the rate of insurance; but in boiler insurance this practice is not followed. It is considered that the ordinary hazards that are necessarily attached to the use of high pressure steam are quite great enough; and a boiler that is not regarded as safe for the pressure to be carried, is not considered to be a fit subject for insurance at any rate whatsoever. Experience has shown that in boiler insurance the moral hazard is neglible. Men doubtless burn their own property occasionally, for the purpose of recovering the insurance upon it; but it is doubtful if they ever intentionally cause their own boilers to explode.

"It being assumed, now, that the agent and the boiler owner have agreed upon the term of the insurance, and upon the sum for which the policy is to be written, and upon the premium that is to be paid, the next step is to make out a formal application for the insurance. Suitable blanks are, of course provided for this purpose, and the agent fills them in by specifying the number, type and location of the boilers, the name of the person or corporation owning them, the face of the policy desired, the term for which the policy is to run, and the premium that is to be paid. The owner then signs this application, and his signature completes his relations with the agent.

"The application, thus made out, is then forwarded to the home office, or to the branch office to which the agent is accredited. The next step after the delivery of the application is for the insurance company to send, to the mill or factory, one of its experts in steam boiler construction and management, to pronounce judgment upon the condition of the boilers, and to give his opinion as to whether they are or are not in insurable condition. This expert is technically known as an 'inspector.' After having made arrangements with the owner to have the boilers cool and ready for examination, the inspector proceeds to the plant where they are located, and examines them with great care. I think that I may safely say that his examination is even more searching than that which is given in the case of life insurance. If the boilers are of a type that will admit of it, he enters them, crawling all about them internally, and noting the dimensions and the actual present condition of every essential part. He also makes a corresponding examination of the external surfaces, recording the thickness of the plates, the pitch of the rivets, and many other items that have to do with the strength of the boiler, and its ability to safely withstand the working pressure that the owner desires to carry. The numerical data that he thus obtains are entered in blank spaces that are provided upon the inner pages of the same application that

the owner has signed. To give some idea of the minuteness of his examination, I may say that the blanks that he has to fill out contain forty-two main questions, many of which have several sub-questions under them, so that in all he has to answer perhaps as many as seventy-five different questions. I cannot give the exact number, because it naturally varies a little with the type of boiler. Questions relating to water tube boilers, for example, are passed over when the boilers under consideration are of the fire tube type.

Testing the Boilers.

"It sometimes happens that the boilers are of such small size, or of such a type, that they cannot be actually entered by the inspector. In cases of this kind, he has to infer their internal condition by making an examination through the several small openings that should always be provided in such boilers, and which are technically known as "hand-holes." In such cases he also applies a "hydrostatic pressure" to the boilers. This consists in filling them entirely up with water, and then forcing a small additional quantity of water into them by means of a pump. By this means a considerable stress is easily brought upon the boilers, and when they are thus under pressure, the inspector notes, carefully, whether or not they show signs of distress. The distress may make itself manifest by leakage from the joints or tube ends, or by the breakage of some essential part, or by the bulging, collapse or rupture of some portion of the boiler, or in other ways.

"Having made a thorough examination, the inspector fills out the blanks provided for this purpose upon the inner pages of the original application, and then transmits the application to the chief inspector of the office from which he comes. He also gives his judgment, based upon the construction, age and condition of the boilers, and upon his previous experience with boilers of the same type, as to the working pressure that the boilers can safely withstand. And, finally, he submits a written report to his office, describing in detail the condition in which he found the boilers; a copy of this report being subsequently forwarded to the boiler owner. It often happens that a thorough inspection of this sort results in the discovery of some defect or structural weakness, which may even be imminently dangerous, and which had not been previously suspected. In such a case the fact is, of course, immediately reported to the boiler owner, and definite recommendations are made as to the alterations or repairs that are required, in order to put the boilers into safe condition again. The owner is also informed that the negotiations can proceed no further until the suggested alterations have been made, and the inspector has subsequently satisfied himself by a second inspection, not only that they have been made, but that they have been made properly and well.

Uninsurable Boilers.

"It sometimes happens, too, that the preliminary inspection discloses the fact that the boiler is in such bad shape that it would be impossible, or at least unprofitable, to try to repair it; and in this event the inspector condemns it; or, which is the same thing, he pronounces it uninsurable. I should like to state, however, that wholesale condemnation is not favored by the boiler insurance companies. They would indeed like to insure nothing but ideally perfect boilers; yet in condemning boilers that are already in service, the inspector is expected to exercise his best judgment, in accordance with safe rules, for the benefit of all concerned; that is, on behalf of the insured, as well as of the company that employs him. His judgment is a disinterested one, so far as he is concerned personally, for his compensation is the same whether he accepts the boiler or rejects it. His company will not insure a boiler that is believed to be unsafe, nor does the owner desire to replace a boiler that is really safe and satisfactory, merely because the inspector would like him to have a somewhat better one. The task of the inspector who condemns a boiler is therefore seen to be a delicate one, involving a number of important considerations; and he is required to give his superior officers in the insurance company full and sufficient reasons for his condemnation, so that the prospective insurer may be really satisfied, in his own mind, that the condemnation is justifiable from his own point of view, as well as from that of the insurance company. We rarely find the boiler owner dissatisfied with the reasons for condemnation that are furnished to him. We cannot force him to replace a defective boiler with a new one; but we almost invariably find him ready to give proper attention to our criticisms; and when he really ought to have a new boiler, it is seldom difficult to convince him of that fact.

"Assuming, now, that the inspector has satisfied himself that the boilers upon which insurance is desired are really in good condition, the next step is the review of the opinion of the inspector by the chief inspector of his department. The chief inspector takes in hand the various measurements and other data obtained by the inspector's examination, and by the aid of them he carefully computes the safe working pressure that his company would be willing to allow the boiler to carry. Usually the estimate so obtained will be found to agree satisfactorily with that given by the inspector; but it sometimes happens that this careful calculation reveals a source of weakness at some point, whose importance the practical eye of the inspector did not perceive; and in such a case the owner of the boiler is notified of the finding, and he must see that the error of construction is remedied before the insurance company will take any further steps towards the issuance of his policy.

"If the inspector and the chief inspector are both satisfied of the safety of the boiler at the time that it is offered for insurance, the policy is issued to the owner, who is thereafter protected, up to an amount equal to the face of the policy, against loss of property from the explosion, rupture, or collapse of his boiler or of any part of it, owing to the pressure of steam. He is also protected (always within the amount for which the policy is written) for any loss or damage to which he may be subjected, from the same cause, by reason of the destruction of his neighbors' property, or by reason of loss of life or of personal injuries to any persons whatever. The damages from loss of life, or from personal injuries, are determined, in this line of insurance as well as in other lines, by the earning capacity of the victims; and also, in the case of personal injuries, by the time during which the unfortunate ones are incapacitated. It is usual to specify in the policy, however, that the liability of the insurance company shall not exceed $5,000 in the case of any one death.

Protecting the Company.

"After the issuance of the policy, the insurance company, primarily for its own protection, but also incidentally in the interest of the assured, regularly makes four inspections of each boiler per annum; and it reserves the right of access, at any time, to the boilers that are insured, and to any and all machinery that may be concerned in the safe operation of the boilers. Of the four inspections that are made per annum, at least one is a complete internal and external inspection, similar to that which is given at the outset, except that it is not necessary to repeat the measurements, these being made once for all. The inspector making these complete inspections prepares a detailed written report in each case, stating in full the condition in which the boilers were found; and a copy of every such report is transmitted to the owner of the boilers.

"In these routine inspections, it often happens that the inspector finds that defects or weaknesses have developed, in the course of the service of the boilers; for boilers, like all other structures that are put to constant use under trying conditions, wear out, and develop troubles of various kinds. In fact, the number of different ways in which steam boilers can go wrong would surprise any person not familiar with the general facts of the case. Many of the defects that are discovered in this way, and pointed out to the owners, are of such a nature that they would be overlooked by the regular attendant. For the regular attendant, even although he has been in charge of boilers for many years, and may be an unusually competent engineer or fireman, has at most seen but few boilers, and so far as his actual experience goes, he cannot be expected to be familiar with many different kinds of defects. The inspector of the insurance company, on the other hand, has seen hundreds and perhaps thousands of boilers (the Hartford Co. insures over 95,000 boilers at the present time), and has watched many of them from year to year, under the most varying conditions; and his training has fitted him to detect and intelligently foresee the consequences of defects whose importance the man in immediate charge of the boilers would

probably never adequately appreciate. Defects that develop in use, and which are detected in the course of the regular periodical inspections, are pointed out to the owner of the boilers in the written reports that are submitted to him. If they are considered trivial, that fact is indicated, and he is requested to bear them in mind, so that any tendency that they may manifest towards increase may be promptly noted. If they are considered to be bordering upon danger, his attention is similarly directed to them, and he is requested to have the necessary repairs made at his earliest convenience; the fact that they have been properly made being subsequently verified by the inspector in person. If they are still more serious, and are considered by the inspector to be immediately dangerous, the owner is notified of this fact also, and he is warned not to put the boiler into service again until it has been made safe. Of course, the insurance company has no way in which to enforce its recommendations; but if compliance with them is refused, the company reserves the right to cancel the insurance at once, and few owners care to incur this penalty. For it is universally admitted that the inspectors are, as a class, men of wide experience and good judgment; and if an explosion should occur after the owner has refused to comply with their suggestions, and has had his policy canceled in consequence, he will not only lose the insurance, but he will also be liable to be subject to heavy suits for damages, on the ground of culpable negligence in refusing to act upon the advice that the inspector gave him, before the accident. When policies are discontinued in this manner, it is customary for the insurance company to return to the assured a certain fraction of the total premium that has been paid.

Magnitude of the Work.

"In order that you may have some idea of the scale upon which boiler inspections are now made, I may say that in the year 1902 the Hartford Co. (which constantly employs more than 200 inspectors) made 105,675 complete internal and external inspections of steam boilers, and detected 145,589 defects, of which 13,032 were considered to be dangerous. In the same year it condemned no less than 1,004 boilers as unsafe for further use, good and sufficient reasons for such condemnation being given in every case. From the beginning of its business down to Jan. 1, 1903, it had similarly condemned 15,169 boilers; and when it is remembered that in most of these cases the owners had no idea of the danger of their boilers until the inspector had visited them, you will see that there is some substantial ground for our claim that boiler insurance is (or should be) very largely *preventive*.

"I have said that it is customary to make at least four inspections of each insured boiler per annum, and I have also said that at least one of these is a complete internal and external inspection, of which the owner is notified in advance, and for which he has his boilers cooled and emptied and otherwise prepared. The remaining inspections are technically known as 'externals,' since they are made while the boiler is in service, and must therefore be confined to the examination of such conditions as can be observed or inferred without entering the boilers. No notification is given in advance of these visits, and consequently no preparation is made for them. The intention is, that the inspector shall have the opportunity of viewing the plant when his coming was not expected, so that he may see it under the ordinary running conditions. He examines the safety valve to assure himself that it is working freely, notes the pressure that is being carried and compares it with the limit that the policy fixes, observes the height of the water in the boiler, and tries the gauge cocks to see if they and the water glass are free. In short, he looks about him generally, to make sure that the boilers are in safe hands, and that they are being cared for properly.

"To illustrate the importance of these 'external' inspections, let me cite one instance that came under my notice. One of our inspectors from the Hartford office visited a cotton mill in Massachusetts for the purpose of making an 'external' examination under ordinary running conditions, and found that nobody was present. The attendant had doubtless been there within a short time, but he had vacated the premises for some purpose. The inspector had hardly entered the room when his experienced ear detected a noise of escaping steam, which he felt assured was not due to any ordinary leakage about a pipe joint. Passing to the rear end of one of the boilers, he opened a door in the brick setting, and speedily satisfied himself that serious trouble was imminent. In an emergency of this kind, the first thing to do is to draw the fire from under the boiler, and (when there are several boilers running together) shut the valve in the steampipe that connects this boiler to its neighbors. By this means the pressure in the suspected boiler is caused to fall gradually, so that the boiler becomes every moment safer. The inspector was just finishing this operation when the attendant returned and, not knowing who he was, challenged him for interfering with the plant. Explanations followed, and when the boiler had cooled sufficiently to permit of examination, it was found that the brick arch over the rear end of the furnace had fallen down, allowing the incandescent products of combustion to strike directly against the upper part of the rear head; and this, being unprotected by water, had become overheated to such a degree that the back head had bulged out, and the brace rivets had drawn through their holes, permitting the steam in the boiler to escape and make the sound which had first attracted the inspector's attention.

Settlement of Losses.

"In conclusion, let me state the methods that are followed in the settlement of losses. When, in spite of the care taken by the inspectors, a boiler explodes and entails loss of property, and probably also loss of life and injury to person, the assured is supposed to notify the insurance company of the loss as promptly as possible. The insurance company then sends its adjuster to the scene of the explosion, and he performs two duties. One of these consists in looking over the ruins in the interest of the insurance company, so as to learn the cause of the explosion, so far as possible. The information obtained in this way has been found to be very serviceable in the prevention of other explosions from similar causes; so that in this way all the patrons of the insurance company derive an indirect benefit from every explosion upon which the insurance company loses. The adjuster also looks over the damaged property in company with some representative of the owner, and together they attempt to reach a fair estimate of the amount of the loss. It usually happens that an agreement of this sort can be reached without trouble; but in case of an irreconcilable difference of opinion, some third and presumably disinterested person is agreed upon as an arbitrator. The loss or damage to which the assured has been subjected being determined, the insurance company forwards its draft in settlement at the earliest date possible, in order that the assured may not be embarrassed any more than necessary in the repairing of the damage to his plant. The compensation to be awarded by the assured to the injured and to the legal representatives of the killed are determined in a similar manner, and the award agreed upon is included, of course, in the draft that is forwarded to the insured. The usefulness of the boiler insurance company should not cease with the payment of the loss; because the representatives of the insurance company have seen so many cases of destruction from boiler explosions that they are usually capable of giving valuable advice as to the best methods of clearing away the wreckage, and of restoring the plant to its original condition of efficiency. Services of this kind are supposed to be given freely, and without charge; because it is understood, throughout the relations of the insurance company and the assured, that the interests of the assured are to be safeguarded and promoted in every way possible.

"Boiler insurance differs in many respects from insurance of other kinds. It does not involve statistical studies to any considerable extent, and the problems that arise are mainly those of constructive engineering, and of the practical management of boilers, so as to prevent deterioration and detect and remedy any defects that may develop in the course of their operation.

"Is the chance that any given boiler will explode great enough to warrant placing it under insurance?" Experience has shown that a rate of 1 percent for three years has been found to be sufficient to enable the insurance company to carry

on its business soundly and with profit. This corresponds to an annual charge of one three-hundredth part of the face of the policy. Something like 10 per cent of this amount is all that need be reserved for the payment of losses, the remaining 90 percent being expended in making inspections, and in other necessary ways—most of this large expenditure being of direct benefit to the assured, since the inspections that are made are of exceeding value to him, in prolonging the life of his boilers, and in promoting their efficiency. The annual reserve, to cover the liability of explosion alone, is therefore only one three-thousandth part of the face of the policy. If the face of the policy fairly represents the damage that an explosion would be likely to cause, you will therefore see that the insurance company's rate is equivalent (from the standpoint of the theory of probabilities) to an even bet that an insured boiler, when inspected and cared for as the insurance company does actually inspect it and care for it, would not blow up in three thousand years, if the natural and inevitable deterioration of the boiler through use would permit of its being kept in service for that length of time. I think I need hardly say that a rate which is based upon a probability of this sort cannot be considered to be in the least degree exorbitant."

The Chicago Meeting of the Mechanical Engineers.

Chicago is an ideal place for a convention of engineers. The city has enough of the desirable features of every type to make a stay of but a few days—May 31 to June 3 in the case of the mechanical engineers last week—of very great interest from the point of view of the technical visitor. This opportunity had the additional merit and pleasure of numerous and congenial companions, well arranged excursions and elaborate receptions and those present at the meeting last week of the British and American societies of mechanical engineers may indeed set it down as a red letter occasion.

Somewhere in the neighborhood of a thousand persons enjoyed the several advantages incident to the convention. The register of visitors and guests as corrected up to 10 p. m. of June 2, recorded the presence of 931 at headquarters. A change in the method of registration was introduced. Instead of the long registration blanks which have been used, each member and guest received at the registration desk a 3-inch by 5-inch blank form, which, when filled out, furnished an original and two carbon copies. One of these was filed in an alphabetical card index and another in one numerically arranged. The third was used as printer's copy for the regular bulletin of attendance. This arrangement was of great convenience in locating members or guests either by name or number. The addition of the name of the hotel at which the visitor was staying was an advantage in looking up acquaintances between the various sessions, but the incorporation of the home residence with details of street and number, etc., certainly expanded the printed bulletin to considerable extent and may have been of doubtful utility. The latest form of badge met general approval. It was a neat improvement on the crude label under experiment at the last meeting. The lapel button in gilt has now a bar in the same colored metal, the bar having a slide for the insertion of the litle slip with the printed surname of the wearer and also bearing the number corresponding to the registration figures. The lettering was in a tiny gothic, but was easily read and very convenient, particularly in a gathering of this magnitude. The members of the Institution of Mechanical Engineers bore a "name plate" of an orange tint while the members of the American Society of Mechanical Engineers wore a white one.

There were but four professional meetings devoted to the reading and discussion of papers. The evening session of May 31 was devoted to a social greeting of the members and guests of the two organizations though some time was given to the more formal duties of an official welcome tendered by the representative of the city and suitable acknowledgment by the presidents of the two societies. A full report of this function appeared in *The Iron Trade Review* of last week. The professional meetings on the mornings of June 1 and 2 were held in the Auditorium Hotel, the last session was held at the Lewis Institute on the morning of June 3 and the one evening session for technical discussion took place on June 1 in the Music Hall of the Fine Arts building. Interspersed with the meetings were excursions to points of technical interest, including a visit to the plant of the Illinois Steel Co., at South Chicago, where many of the engineers were under treatment by a skillful photographer, as shown by the accompanying halftone; to the plants of the Chicago Edison Co., and Swift & Co. The complete program of the social features was given some time ago in these columns, and in every particular was carried into effect with rare skill and courtesy by the vigilant local committee.

The first item of importance on the assembling of the members on Wednesday morning was the announcement by President Swasey that the council of the society had conferred honorary membership on Past President John E. Sweet. President Swasey took occasion to pay a cordial tribute to Mr. Sweet and said that the action of the council had been unanimous. The incident was received with hearty expressions of approval.

Union Engineering Building.

Secretary Hutton at this time gave a general report of the past and present of the project for a union engineering building. He gave in witty style a historical sketch of the donation and its results, "the raising of the ante" from $1,000,000 to $1,500,000, and the various steps taken to bring about the desire of the donor which have been detailed in the technical press. The speaker told of the remarkable similiarity of the space requirements of the three organizations and that while this amount might be put at 5,000 square feet for each, the allotment of a separate floor would give them nearly 9,000 square feet of floor space and this would take care of considerable future growth. The committee had bestowed much thought upon the large auditorium. Experience had shown that the best acoustic conditions were none too good for the purposes of discussion and if possible the arrangement should permit a speaker in any part of the hall to be heard distinctly throughout the room. It had seemed to the committee that the auditorium should be designed for a limit of 1,000 persons on the floor and 500 in the gallery. There will be smaller auditoriums with a capacity of 500 and less. There will be three and possibly four floors above the three occupied by the American Society of Mechanical Engineers, the American Institute of Electrical Engineers and the American Institute of Mining Engineers. On the top floor, which will probably be the twelfth, there will be the consolidated libraries. A scheme is under consideration by the committee for a working arrangement with the public library which is near by. Prof. William R. Ware has co-operated with the committee as technical adviser in making the awards resulting from the competition. Six firms have accepted the invitation to compete in the preparation of designs. These are Messrs. Ackerman & Partridge, Carrère & Hastings, Clinton & Russell, Lord & Hewlett, Palmer & Hornbostel, Whitfield & King. The committee has agreed to pay each of these firms $1,000 as compensation for preparing designs. In case one of these is the successful competitor, the money paid to it will apply on the architect's commission. From other firms, plans will be received if the firms have been in actual practice for two years previous to July 1, 1904, and are acceptable to the committee. This follows a suggestion of Mr. Carnegie in regard to the invitation of young but deserving architects, and therefore four $400 prizes have been offered to architects outside of the firms already mentioned, and if one of these proves to be the successful competitor, the prize will be considered as a credit on his commission. The committee expects to receive a carefully studied general scheme, which will show in what way details can be carried out, but will not include definite plans for such details. Any information given by the committee to one of the architects was, at the same time, given to all the rest, but all questions were submitted before the 20th of May to the secretary. Six weeks from May 5 has been fixed as the time limit of the competition. It is not expected that these preliminary plans will show more than small sketches of the facade and the general layout of

the interior, but these will be at the disposal of the committee by June 20. Incidentally Mr. Hutton said that there had been considerable interest taken in the "open" class of architects and that he had received some sixty applications for specifications. The old buildings will be torn down immediately after July 1. The rear and side walls of the new building are to have a reasonably finished appearance. The libraries, assembly halls, offices, and meeting rooms of the various organizations will be in one building. The engineering building will have a frontage of 125 feet on West Thirty-ninth street, and a depth of 98 feet 9 inches. The Engineers' Club building will have a frontage of 50 feet and the same depth as the other. Fifteen percent of the space occupied by the Union Engineering building must be open space, under the city ordinances. Each of the societies interested in the building will reserve a floor for its own uses, and the division will be somewhat as follows: Reception room, 1,000 square feet; editorial room, 300; secretary, 300; counting room, 600; office staff, 900; committee rooms, 1,000; stationery and transactions, 1,200; storage, rooms, 400. There will be provision for a library containing 50,000 volumes, but accommodations will be provided for six or eight times that number, and provision made for book stacks. The committee intends the library to be open to the reader with every facility for access to the shelves. On the lower floors, provision will be made for ample coat rooms, and bureau of information containing telephone and telegraph offices, a postoffice, and also shipping and receiving offices. The basement will contain storage for transactions and other property of the societies, and in the sub-basement will be located the power plant, which will occupy about 3,600 square feet. Communication will be had with the Engineers' Club by a passage way at the street level and by a bridge in one of the other stories. Provision will, of course, be made for elevator, mail chutes, and other conveniences. The Engineers' Club building will be eleven stories high, with a half-story additional in the rear for the kitchen.

The Problem of the Basis for Wages.

The paper by Harrington Emerson on "A Rational Basis for Wages" was then briefly introduced by the author. This paper was published in the columns of *The Iron Trade Review* last week. Mr. Emerson briefly introduced his paper by a reference to his residence at Topeka. During the disastrous floods out there a number of men had willingly undertaken relief work without hope of financial reward. They had gone out for the imperiled women and children and had brought them to places of safety before making any attempts at the task of rescuing men. They had steadily refused rewards for heroic work performed or bribes to make any change in the program of operations and had freely given their labor and their time with the possible offer of their lives. Wages were inadequate to compensate efforts of this sort, which showed the highest influence of the heart over the occupation. The line of argument taken by Mr. Emerson reminded one of his hearers of the case referred to by President Andrews, of the University of Nebraska, to illustrate the difficulty of remunerating labor in its higher grades. There is a professor in the University of Edinburgh who has performed a most critical operation in surgery with astonishing success. He has, in fact, done the work 68 times without fatal results and Dr. Andrews inquires "How shall we apportion that man's wages to his worth?" Some of the points made by the author of the paper were far from being to the liking of all of his hearers and appeared to be least welcome to the visiting engineers. Mr. Emerson had been given to understand that there were gentlemen's clubs in England where the applicant for membership was required, as a manufacturer, to have more than 1,000 employes or he could not gain admittance. The statement was not a useful addition to an otherwise careful and logical paper and it stung his British hearers to vigorous reply.

Emerson Bainbridge promptly took the floor and said: "It seems to me that this paper offers many extraordinary suggestions. In fact, it may be asserted that instead of offering a rational basis for wages, as the title indicates, the paper seems to have a tendency toward very irrational suggestions. It confuses the relation of capitalist and laborer. It also assumes that the employer is an uncommercial, inexperienced and irrational individual and the workingman a downtrodden and ill-used serf. Fuels are bought upon the basis of very careful tests. Coke for example is purchased with a knowledge of the amount of moisture, the percentages of sulphur, phosphorus, etc., as ascertained by chemical analysis. What in the world does the gentleman mean when he speaks of an 'unintelligent and unmindful government?' The statement sounds to me just a bit libelous. Then there is the assertion of the numerical qualification required for membership in English clubs. It is a preposterous statement." Mr. Bainbridge pleasantly reminded his hearers of the fact that he and the writer of the paper had in their respective names the word "Emerson" and this might have some influence upon the peculiarity of their points of view. He also told the well-known and apt story of the engineer called in haste to make an examination and repair an engine and who followed up his hurried survey of the situation by a rap or two of a hammer and the prime mover was at once in condition to start afresh. When the expert sent in his bill it was ascertained that the actual work was charged up as costing but a shilling or two while "the know how" figured at the rate of several pounds, the illustration serving to emphasize the difference between mental and physical ability and its proper relative reward. In conclusion, Mr. Bainbridge said, "I do not know how far the opinions of the author of the paper coincide with the general sentiment in America, but what we want in England is to get the very best out of our men."

E. J. Chambers followed, and said, "I am surprised that such a paper comes from an American. The writer seems just to have awakened to something that we have been aware of for a number of years. If the paper had come from an Englishman the shock would not have been so severe, because you know we are supposed to be a bit slow. The tone of the paper carries us quite back to feudal times. 'The laborer sells his liberty.' Is it not rather a partnership and not a loss of liberty? I have never considered that when I employed a man I had purchased his personal freedom. I feel instead that I have entered into a sort of partnership with him. I shall be greatly surprised if this paper meets the approval of this assembly." The speaker recalled that when he was serving his time as an apprentice to the trade of a machinist, some 45 years ago, one of the young fellows in the shop wanted more wages and in response to the question, "Is sixteen shillings not enough?" retorted, "Why, it takes fifteen shillings to keep me honest and I cannot work for one shilling."

President Wicksteed complimented the author of the paper upon his excellent analogy between coal and labor and the basis upon which each should be purchased. It was, however, a very difficult thing to analyze the possibilities of the workman and this could not be done with the completeness with which coal could be handled. H. H. Suplee gave an interesting statement of the recent examinations held in the New York public schools. The plan and scope of the investigation had been to ascertain from the children the degree of success attained by their teachers, not so much a test of the knowledge gained by the scholars as an examination into the methods of the teachers. The result had demonstrated that the trouble in many instances was not the inaptitude of the pupils but the deficiencies of the teaching force and the system followed. He ventured to assert that in shops the trouble was not in every case the fault of the workman, but could in like manner be found higher in the scale than the employe were proper analysis of the conditions undertaken.

In closing the discussion Mr. Emerson said that his reflections upon the intelligence of the employers was not directed at mechanical engineers who treated the matter of the employment of labor in the same manner as other practical shop questions. He did insist, however, that the average employer knew very little about his business or about his employes. He illustrated his argument by citing sundry instances of emery wheel practice, cases where an increase of 1,000 percent efficiency could be made with properly mounted and speeded wheels. He had removed the remnant of a cup wheel in one shop where the rim had been worn away down to the brass guard and said he had been asked to replace it as soon as possible as it was very much needed. "In the handbook which

has so thoughtfully been provided for us by the Chicago members of the society I find no mention of one of the most interesting incidents now in progress in Chicago—the strike of the machinists against the employers and of the employers against the machinists. It seems to me, in looking upon this deplorable struggle which is wasting the energy and the resources of both employer and employe, that the employer is not wholly blameless. My plea for the establishment of wages upon a rational basis is made in order that the individuality of the workman which is now lost in the eternal struggle between the union and the association may be restored."

Refuse Disposal in Cities.

The remainder of the session was devoted to the reading of papers on the burning of town refuse. Three contributions had been submitted by English engineers at the request of the American Society of Mechanical Engineers and these were followed with close attention. The engineers who were selected to prepare the papers had had unusual opportunities for the investigation of the subject and the material presented will be valuable not only in Chicago, but the many cities along the American lakes, where the lack of tidal ebb and flow renders the treatment of refuse even more difficult than at the seaboard. Destructors are, of course, employed to some extent in the United States, but the densely crowded sections of manufacturing Britain have brought the question to the front in more abrupt fashion.

At a later session an invitation was extended to the engineers by Mr. Calvin D. Rice. He desired the visitors on their return to the Atlantic coast to visit the island where the city refuse of New York is treated, and in answer to a question by George R. Dunell, said that the method was mainly by cremation. The difficulty of destroying town refuse and at the same time making useful the process of combustion is increased by the uncertain character of the fuel. Calorimeter tests would be futile in view of the impracticable nature of the material for such purposes. A representative sample for calorimeter use would of necessity be taken from a collection containing garbage, vegetable matter, dust, straw, paper, rags, bones, broken glass, tin cans, wood, cinders, sacks, old boots, buckets, casks, carpets, etc., to say nothing of the carcases of cattle, dogs, cats and pigs, the latter being sometimes brought in numbers after an outbreak of swine fever. Mr. Watson asserted that "Among the articles gravely registered as having been destroyed at one of the early Leeds destructors was 'one sea serpent.' In two instances parcels of explosives have found their way into furnaces and blown out the fronts, fortunately without causing bodily injury in either case. To state the nature of the miscellaneous rubbish comprised in the refuse of towns is to demonstrate at once its unsuitability for agricultural manure and the danger of allowing it to accumulate."

Mr. Charles Wicksteed had had some experience in his town with the installation of refuse destructors and intimated that they were far from perfect. He had felt great sympathy for the men engaged in the unpleasant work of attending the furnaces and both from the odor and the amount of dust scattered over the neighborhood, was inclined to class the installations as necessary evils. They were nuisances under any circumstances. George R. Dunell took exception to these statements and could only account for them on the ground that the experience of the previous speaker had been with an imperfect apparatus. He could not allow the statement to go unchallenged, as the gentlemen who had heard Mr. Wicksteed might imagine that destruction by cremation is a great failure. Mr. Dunell had had experience with the Horsefall destructor and the one invented by Mr. Watson. The gases were passed through a red-hot chamber and reduced to CO_2 and, of course, there was no after smell. An ample supply of air was given the furnace and he had known of a horse reduced to ashes with absolutely no perceptible odor. The dust problem was a much more serious matter but this was successfully treated by the vortex or centrifugal method, the gas being given a rapid circular flow which cast the entrained dust to the side and this too had proved practicable. He could only assure his hearers that Mr. Wicksteed's testimony was of a purely negative character and his own assertions were positive and he was certain that destruction of refuse by cremation was the only right thing.

The Steam Turbine.

The evening session of June 1 was held in the Music Hall of the Fine Arts building and was practically a symposium upon the increasingly important topic of the steam turbine, though the concluding paper by Prof. C. V. Kerr related to other prime movers as well and was more especially an advocacy of the term "potential efficiency." Prof. Kerr said that the term "potential efficiency" might be replaced by "kinetic efficiency" when a De Laval steam turbine or a Pelton wheel was under consideration. In volume 24 of the *Transactions* the thermal efficiency ratio is the proportion which the heat equivalent of the power developed bears to the total amount of heat actually consumed as determined by test. In a recent magazine article Prof. Rateau explains the term "global" efficiency as the combined efficiency of the turbine and dynamo as measured by the ratio of the actual consumption of the engine to the theoretical consumption of an assumed perfect engine. There is doubtless a common idea under all this and the purpose of the paper was to give the idea more definite form and a characteristic name.

Prof. Reeves sent in a written discussion in which he alluded to his own efforts as a missionary and his conviction that in such work he was a failure. His suggestions in similar lines had been ignored and he felt in a hopeless minority. Prof. Jacobus corrected some statements relative to the work of the committee on engine tests and later called attention to the close comparison of the tests described in the several papers on the steam turbine. Giving due regard to the various sizes and conditions, the comparison between the machines was very close.

Prof. Storm Bull said that the titles of the papers were misleading; they were devoted to the Parsons, the De Laval, the Curtis and the Rateau turbines, and he would have preferred that each of these machines had sailed under its own colors. The tests had not been made by disinterested parties and they were therefore a little doubtful. He also suggested that the action of the Parsons turbine was not as stated due to impact; "impulse if you please, but not impact." The keen thrusts of the genial professor were parried by Mr. George I. Rockwood, who appreciated the value of "a rabid trade discussion" and was sorry that he could add no venom to the subject. He thought that the practice of turbine builders was wrong in the matter of the exhaust. The late Jerome Wheelock had told him some 18 years ago that a larger exhaust pipe was essential where the opening was directly into the atmosphere than where it was connected to a condenser. There was, of course, the element of friction of the steam in the pipe, but there was also something about the conditions not easily explained. He had lately had an instance in his practice where he had connected up a condenser which was already in the plant, the connection being made for the purpose of demonstrating to the owners that the old equipment was too small for the later installation. He was surprised to find that the results were not nearly so conclusive as he had anticipated. The peculiar action of the turbine jets was mentioned by several speakers and H. H. Suplee referred to a visit he had paid to Prof. Studholtz at Dresden. The professor has made a close investigation of the action of steam in nozzles and was frank to state that peculiarities of the swirls and eddies of the jets were a constant source of surprise to him. Mr. Collis mentioned the abrasive nature of the steam jet as suggestive of the cutting of metals by plain metal discs of no greater hardness than the severed material as in the case of trimming steel rails to length. The wear of the buckets under the jet action did not, however, receive very lengthy consideration.

Power Plant of Tall Office Buildings.

At the meeting on Thursday morning the tall office building was the initial subject for attention and J. H. Wells, in the introduction of his paper, feared that he had not given sufficient credit to the architect. The latter was responsible for the building. Mr. Collis brought out the fact that the original system of electric wiring for office buildings has not been superseded, despite the innovations in other directions. It is

acknowledged to be the best for isolated plants. George I. Rockwood believed that the plunger type of elevator would displace both the electric and the cylinder kinds. The Waldorf hotel will install the plunger form of elevator. It was a personal matter but he would take the opportunity of reminding the members that a certain pipe joint was mentioned in the papers as being generally adopted. He did not like the name there given to it, as he had taken out a patent upon it. The question of ventilation has not received the attention in office buildings that it might properly be given, and the use of exhaust fans for the several floors communicating by the transoms, etc., the passage of vertical ducts through the walls and these communicating with the individual rooms and a fan at the common outlet, were briefly noted. Mr. Wells in his reply said that he had not covered many highly important points as fully as could have been desired. He was limited by the committee to a thousand words and he could easily have taken three hours for the treatment of the subject. The power question was not to be settled by the relative amounts at which engines and boilers were to be purchased but by the all-important test of continuous service. An hour's delay might mean the loss of a tenant and a month's rent would make more than the difference between one piece of apparatus and another.

The paper by V. I. Raven on the electric and hydraulic power plant at a Middlesbrough, Eng., dock was sharply criticised by another British engineer who alleged that the comparison was not a fair one. A succeeding paper on the use of reheaters and superheated steam in compound engines of large size brought out the unanswered query by George H. Barrus as to why the tests had not been made according to the standards of the society. "If they were good they should have been followed and if they were poor the author should have stated his objections." Mr. Rockwood said that the records were all beaten by a high ratio engine some twelve years ago. There was a difference of 17 percent in favor of the high ratio compound, according to tests made by Mr. Barrus.

The Test Bar Question Again.

Friday morning the members met in the auditorium of the Lewis Institute and the paper of Dr. Wm. Campbell, on "Effects of Strain and of Annealing," was first presented with the aid of the lantern. The micrographs were shown on the screen at a total magnification, as President Wicksteed was careful to point out for the general benefit, of one thousand times the originals. William J. Keep, in presenting his paper on "Cast Iron Composition, Strength and Specifications," said that his object had been the fulfilment of a request made a year ago that the writer should give in some way before the society the work done toward standard specifications. Another object of the paper was to present some argument against a change in the accepted form of test bar. A written discussion from Thomas D. West was read by Secretary Hutton, in which it was claimed that there was no difficulty in obtaining solid round test bars. Mr. West said that the committee appointed by the American Foundrymen's Association, as well as that of the American Society for Testing Materials, had endorsed the round bar cast on end in preference to the square bar. The latter, he said, was not condemned because it reduced the strength of the bar, as Mr. Keep had stated, but because it had given erratic results and its corners were greatly affected by variations in dampness of molding sand and in the temperature of metal when pouring, the evils being greater the smaller the bar.

H. Emerson bore testimony to the practical value of the studies of Mr. Keep and recounted his experience with the reorganization of a plant that apparently had an excellent foundry. The foundry practice did not seem to him capable of improvement with current conditions and he turned his attention to the machine shop. Much to his surprise the machine shop was a witness against the foundry which was proved thoroughly unreliable in the quality of its product. He had taken Mr. Keep's tables and had from them obtained a uniform output from that foundry, and therefore took occasion to thank the author for his work. E. J. Chambers said that the 2 x 1 inch test bar has been accepted in England and was found satisfactory. He was opposed to the casting of test bars on end; the head of metal would give results quite out of sound practice. Mr. Crosta, of Nottingham, who has done considerable work for the Government in England, said that in all cases the test bar is left to the judgment of the molder who can cast it vertical or horizontal. It is nevertheless run at the same time as the main casting and is broken off by the inspector with a blow of the hammer. Mr. Keep in closing the discussion made inquiries respecting the method employed in England for testing the bar, whether the bar should be edge up or on the flat. The American Waterworks Association has adopted the 2 x 1 x 38-inch bar and this is tested on the flat, while the English practice is to test on the edge. President Wicksteed suggested that the idea might be a better test of the compression and extension relative to the deflection produced but Mr. Keep was rather of the opinion that the bar would show higher results and was, therefore, apt to mislead the experimenter.

Cutting Speeds.

"Experiments with a Lathe Tool Dynamometer" was presented by D. Adamson, of Manchester, in the absence of the author, Dr. Nicolson. President Wicksteed on this, as on other occasions, added to the value of the discussion by an appreciative introduction. He had been a tool builder all his life, and these experiments and the work of Messrs. Taylor and White had had a great interest for him. It would seem that there was a critical point for the cutting speed. It did not necessarily follow that when a tool gave way at the point it was run at too high a speed; it might be run too slow. The preliminary trials had shown that a foot per minute, *more or less*, in the cutting speed made a great difference in the duration of the experiment. Some of the experiments were under far different conditions. A foot of travel in 4½ hours had been compared with a rate of 100 feet per minute. One of the things developed quite prominently by the experiments was to provide for vibration. Mr. Emerson, after some description of the time study of the inventors of the Taylor-White process which led naturally from one to the other, directed attention to the fact that the greatest amount of time saved was not necessarily gained in the time required for cutting. For instance, he had seen the time reduced on one job from 40 to 20 hours, but only 3 hours were required for the actual cutting of the metal. Other speakers mentioned the railroad requirements of 5,000 pounds at the point of the tool and a specified cut, the speeding of countershafts, the encouragement of similar investigations in this country, etc.

In the symposium on the testing of locomotives, Secretary Worthington spoke with cordial appreciation of Prof. Goss and his beautiful experiment of passing a wire between the rail and the driving wheel, the flattened surface bearing a record of the unbalanced forces.

Judge Kohlsaat, of the board of trustees of the Lewis Institute, was introduced. He remarked upon the difference between himself and his hearers. As a judge he had necessarily given attention to patent cases, but has to confess that even as a boy he could not build a kite. It was therefore somewhat embarrassing for him to come before an association of this kind, but on behalf of the board which he had the honor to represent he welcomed the members. While everyone is a theorist, he believed that the world is most indebted to the men who do things, and in that class he included his audience.

A number of resolutions were then presented by the two presidents and Secretary Hutton. These embodied complimentary acknowledgments of the collective and individual efforts that had carried the happy suggestion of James Rowan, of Glasgow, to so satisfactory a termination; and thus the professional meetings at Chicago, with their various attendant attractions and ample fulfillment of anticipated pleasures, passed into history.

The Carp charcoal furnace, Marquette, Mich., has gone out of blast, and will remain idle for three months, in keeping with the outlined program of the charcoal furnaces in the Gladstone, Newberry, Ashland, Elk, Rapids, Mancelona, Detroit and Marquette regions, to curtail production. The Cleveland-Cliffs furnace at Gladstone has already gone out, but for a period of six months. The North Marquette stack of this company is, however, to remain an active producer and will not go out for the three-month period.

NOTES ON A SUCCESSFUL PIECE PRICE SYSTEM.*

BY JOHN MAGEE, CHELSEA, MASS.

In these days of profuse trade literature we hear much concerning shop methods, accounting and kindred subjects, but somehow the foundry does not seem to get its share of the modern ideas that are coming into use, and particularly there seems to be little available information in regard to determining pay under the piece price system. It may therefore be of interest to set forth the outline of what has proved a successful way of handling the problem in a large specialty foundry.

As we all know, the detail of this class of work is very great, since it is not uncommon to find over five thousand patterns regularly used in a foundry of this kind, each of which must be priced every time it is made, which (together with the accounting for the defective work not paid for) induces fruitful sources of trouble when mismanaged.

Starting at the root of the question, it is first necessary to

REPORT OF DEFECTIVE CASTINGS.
Friday April 1 04
ANY CORRECTION IN THIS SLIP MUST BE MADE THE SAME DAY SLIP IS POSTED OR THEY CANNOT BE CONSIDERED.
WORK SENT OUT MONDAY WILL BE ON A BROWN SLIP.
" " " TUESDAY " " " PINK "
" " " WEDNESDAY " " " SALMON "
" " " THURSDAY " " " GREEN "
" " " FRIDAY " " " YELLOW "
" " " SATURDAY " " " DARK BUFF "
No. of Pieces
Size
Name of Piece
Stamp Number
1 8 Ind R. Bot 148
1 5½ B&A Basetop 69
Name of Piece
Un-numbered work × 108
2 1 10 gear 57
5 8 Bor leg 69
20 10 7 Gr. flue stopper ×

FIG. 1.

have a basis for prices that is beyond all dispute, and back of which there is no appeal. This is secured by a contract in duplicate, giving the molding price of each casting made, one copy of which is signed by the firm and one by the regular price committee appointed by the molder's union. Some of our members, who run non-union or open shops may object to this idea, but it certainly has been a most satisfactory way of meeting the question, and one that has worked without friction. When once signed, the lists stand as a basis for all time, and are religiously lived up to by both sides.

New work is priced before going into the shop, and in case of a dispute the firm has its signed list to fall back upon, which is an unassailable foundation. Of course wages are subject to a percentage increase or decrease in case of a general change throughout the trade at large, or any particular piece may be entirely re-priced in case the method of doing it, or the appliances used are changed at any time. But this list is always a basis on which the whole pace of the shop rests, and its value cannot be overestimated.

Each molder is assigned a number and given three stamps each bearing it, with which he marks the cope of each mold. All castings pass through an inspector's hands for preliminary inspection, and he rejects the greater part of the defective pieces. But every man in the employ of the company is also

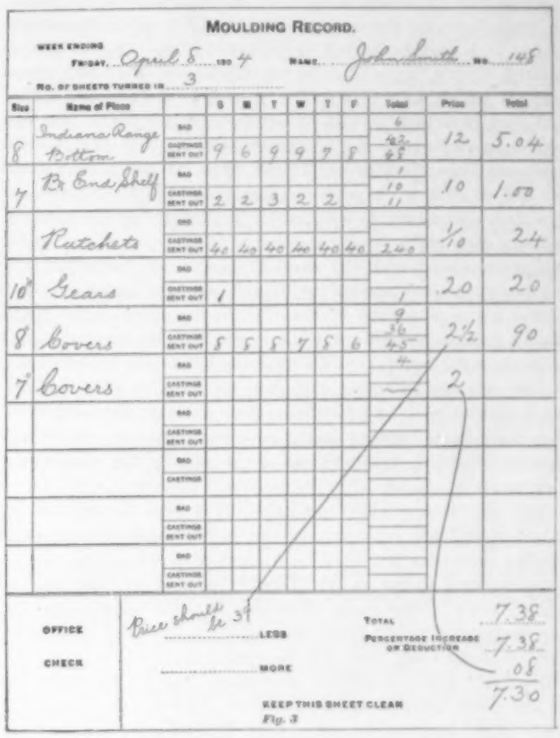


Fig. 3

held responsible for the castings that pass him, and many are thrown out by those who assemble the work.

The rejected castings are sent to the foundry once each day, accompanied by a list made out as shown (Fig. 1). The number on the right being the molder's numbers as found on the castings. This dead heap, as it is known in the shop, is taken into the foundry at eleven o'clock each day and piled where it is easily accessible with the list posted near it. All work not bearing a number is posted on a separate sheet. Every

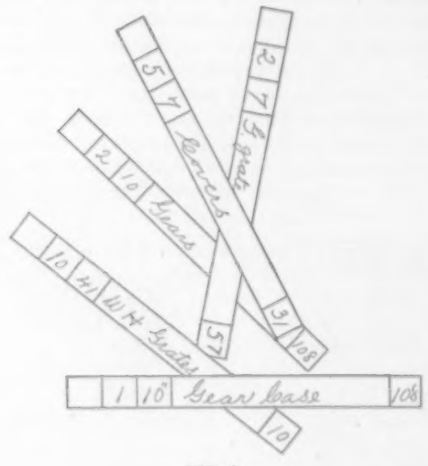


FIG. 2.

workman has his chance to examine them, and should he find castings discounted to his number, the work is before him, and he can learn the cause. In case the piece has been debited to the wrong man through some error, or in case an employe considers a certain piece improperly discounted, he must bring the matter to the attention of the proper party before three o'clock, at which time the lists are taken down, the castings sent to the stage for remelting, and the transac-

*Read at the Indianapolis meeting of the American Foundrymen's Association, June, 1904.

tion absolutely closed, no matter what mistakes or errors may have been made.

The sheet bearing the list of work with no numbers is also examined by each man, who may supply the missing number, writing it on the sheet himself, in case he find one of his pieces included there.

When this list is taken down all unclaimed work is looked up, the number of the maker added, and the work discounted double as a penalty for not supplying the number (see pieces marked X, Fig. 1). After being turned into the office these lists are cut up, as shown in Fig. 2, to give the separate items, and filed in a rack composed of small pigeon holes, one for each man employed. An account of the work is kept by the workman himself on proper blanks (Fig. 3) and turned in at the end of each week, with the prices also filled in as shown. The firm takes a duplicate account, a clerk going through the foundry each night for the purpose. At the end of each week this is compared with the molder's record, the prices he has put down checked against the signed lists, the number of defective pieces as shown by the slips in the pigeon holes bearing his number are put on, these rejected pieces are subtracted from the total numbers made, and the balance is paid for.

Any castings that are sent into the shop at the time the list is posted may be taken from the pile, sent out, and since they have been charged and discounted once, the two transactions balancing, they are again charged by the molders as new work would be.

The pay sheets, after the totals have been transferred in the pay-roll, are returned to the molder, and before each payday each man is visited by a clerk who makes any corrections required in the spaces marked "more" and "less" on the record sheet. This clerk takes with him the signed lists and the discount slips arranged in a suitable rack, the lists being final as regard pay, the slips as regard discount.

Discount lists are written on different colors for each day in the week, so that it is possible to fix the exact date that each piece was discounted should the occasion arise for so doing. This is one of the best methods for handling the detail of this work, and seems to be very popular with the workman on account of its fairness to both sides.

Continuous Sheet Mill at South Sharon.

At South Sharon, Pa., the American Sheet & Tin Plate Co. is pushing work on the erection of a continuous sheet mill. The mill will be located in the plant of the Sharon Sheet Steel Co., which was taken over by the United States Steel Corporation in the purchase of the Sharon Steel Co. properties. This plant contains twelve mills, but was never operated. It is believed that the process for the continuous rolling of sheets will be similar to the continuous tin plate process, now in successful operation at the Monongahela tin plate plant of the American Sheet & Tin Plate Co., Pittsburg. This process is the invention of C. W. Bray and he is also working on the continuous sheet mill at Sharon. It is believed that the plant will be ready for operation about the first of next year.

Notwithstanding the general let-up in business, the John F. Allen riveting machines have been in demand. The company reports recent sales as follows: Worden-Allen Co., Milwaukee, Wis., 1 machine; Scully Steel & Iron Co., Chicago, 2; Brookville Bridge Works, Brookville, O., 1; American Car & Foundry Co., Berwick, Pa., 4; Mt. Vernon Bridge Co., Mt. Vernon, O., 1; Penn Steel Co., Steelton, Pa., 2; Portland Co., Portland, Me., 1; W. F. Remmpis Co., Reading, Pa., 1; R. C. Stone, Springfield, Mo., 1.

J. J. McCabe, 14 Dey street, New York, has recently bought out the entire machine tool equipment of several large shops, including lathes, planers, upright and radial drills, boring mills, shapers, milling machines, universal grinders, screw machines and gear cutters, in addition to a number of boiler shop tools.

The Napier Pig Iron Co., of Napier, O., has filed a suit for a receiver for the Anderson Malleable Iron Co., alleging failure of the defendant to take up notes aggregating $5,500.

PERSONAL.

J. E. Touch and Benjamin Head, of London, are in the United States, having come about three weeks ago on business connected with the Otis Steel Co., of Cleveland.

Chas. M. Schwab and J. W. Duntley, of the Chicago Pneumatic Tool Co., have gone to Europe. They will attend the annual meeting in London of the Consolidated Pneumatic Tool Co.

James Duane, superintendent of the Pulaski and Crozer furnaces of the Virginia Iron & Coke Co., Bristol, Tenn., has resigned.

Henry Jones has been appointed superintendent of the mills of the United Steel Co., Canton, O., succeeding Henry W. Thomas.

Thomas McQuiggan, superintendent of the boiler department of the Edgar Thomson plant of the Carnegie Steel Co., Pittsburg, has resigned to accept a similar position at Bellaire, O.

David Jenkins has been elected vice president of the fifth district of the Amalgamated Association of Iron, Steel and Tin Workers, which embraces Youngstown, O., New Castle and Sharon, Pa.

Ernest Tietgens has been appointed superintendent of the Bessemer department of the Republic Iron & Steel Co., Youngstown, O., to succeed W. R. Edwards, deceased. Peter J. Gordon, in addition to superintending the blooming and billet mills of which he now has charge, will be Mr. Tietgens's assistant and have general oversight of the operating department.

Elmer Marquette has resigned as superintendent of the upper works of the Carnegie Steel Co., Youngstown, O.

J. Y. Brooks, superintendent of the wire, rod and nail departments of the Colorado Fuel & Iron Co., Denver, Col., has resigned. He will be retained by the company in a consulting capacity. Stephen Hogan has been appointed to succeed Mr. Brooks.

C. L. Day, division freight agent of the American Steel & Wire Co., has been transferred from Cleveland to Chicago. J. A. Coakley, who held a similar position in Pittsburg, has been transferred to Cleveland and has been succeeded by R. S. Davis.

John Bott, formerly chief engineer of the Republic Iron & Steel Co., Youngstown, O., has accepted a position in an engineering capacity with the Lackawanna Steel Co.

Albert J. Pitkin has been elected president of the American Locomotive Works to succeed the late S. R. Callaway. He served an apprenticeship at the machinist's trade with the Webster, Camp & Lane Machine Co., Akron, O., now a branch of the Wellman-Seaver-Morgan Engineering Co. Mr. Pitkin worked in the drawing room at the Webster, Camp & Lane shops for some time and later secured a position in the drawing room of the Baldwin Locomotive Works at Philadelphia, Pa. Here he advanced to the position of chief draftsman. He left the Baldwin Works to become superintendent of the Rhode Island Locomotive Works, at Providence, R. I. After a little over a year in the latter place he was called to be superintendent of the Schenectady Locomotive Works, which place he retained until the organization of the American Locomotive Co.,when he was elected vice president and manager. Mr. Pitkin built up the capacity of the Schenectady works from about fifty small engines a year to over four hundred large engines a year before the organization of the American Locomotive Works, thus making the Schenectady plant the second largest locomotive works in the world. Mr. Pitkin's successor as vice president is J. E. Sague. Leign Best has been elected third vice president and retains the office of secretary.

In contrast with general conditions prevailing in the steel trade is the activity at the plants of N. & G. Taylor Co., at Philadelphia, Pa., and Cumberland, Md. Both plants are engaged largely in the manufacture of roofing tin and extra shifts are contemplated to keep up with the demand. Recent extensive improvements will provide a much larger output. The open-hearth furnaces and rolling mills at the Cumberland works are running full time, the results obtained from the equipment recently installed being very satisfactory.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers in the Market and Some of Their Wants:—

The Motor & Mfg. Works Co., Ithaca, N. Y., has been incorporated with a capital of $25,000. Directors are: J. G. Y. Burkholder, Hamilton, Ont., and David Reid and E. A. Gillette, Ithaca.

The Parsons Machinery Co., Marlboro, Mass., has been incorporated with a capital of $200,000. President and treasurer, Henry Parsons, Marlboro, Mass.; vice president and clerk, Chester H. Parsons, Marlboro, Mass.; directors the same, with the addition of Walter M. Lindsay, Boston.

The Maxwell & Fitch Co., Rome, N. Y., has been incorporated for the manufacture of gasoline engines. Capital $12,000. Directors are: H. B. Maxwell, L. M. Fitch and Christina S. Fitch, all of Rome.

The Atchison, Topeka & Santa Fe Railroad Co. is asking for bids on machinery for its various shops. The list aggregates more than $100,000 and will include wood and metal working machinery for the shops at La Junta, Colo., and in Albuquerque, N. M., as well as various repair shops along the road. W. E. Hodges, general purchasing agent in Chicago, will make the awards.

A. Clement, of Lavellois-Peret, France, a very extensive builder of automobiles, is making inquiries for and purchasing a large amount of American machinery. Large extensions are to be built to the plant at Layellois and also to the Clement plant in England. Mr. Clement has a small plant at Hartford, Conn.

The American Automatic Fire Curtain Co., with a capital of $100,000, has been incorporated at Buffalo, N. Y. The directors are: C. F. Adams and Charles Diebold, of Buffalo, and G. W. Walters, of Bowmansville, N. Y.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until June 21 for machine tools for the navy yards, Portsmouth, N. H.; Boston, Mass.; New York; League Island, Pa.; Washington, D. C.; Norfolk, Va.; and Pensacola, Fla., comprising lathes, drills, drill press, punches, shapes, planes, grinders, saws, molders, cutting machines, plate bending machine, boring mill, duplex folding press, arbor presses, locomotive steam cranes, air compressor, concrete mixer, electric elevators, tubular boiler, hydraulic jacks, hand trucks and installation of fire extinguishing apparatus.

Following is a classified list of the machine tools, for the Mare Island Navy Yard, bids for which will be opened June 22: One turret lathe, two wood turning lathes, one double dry grinder, one plain double dry grinder, one automatic knife grinder, one universal tool grinding machine, one improved scroll saw, one 42-inch band saw, one improved band sawing machine, one motor driven heavy pattern lighting self-feeding rip-saw, table, one metal cutting circular saw, two motor-driven shapers, one improved hand jointer, one double spindle upright molding machine, one automatic plug cutting machine, one pipe threading and cutting machine, one four-spindle, nut tapper, six electrically operated sensitive bench drills and one heading upsetting and forging.

The Buckeye Forging & Specialty Co., Sebring, O., has been incorporated by F. A. Sebring, O. H. Sebring, E. H. Sebring, Louis Hoecstetter, W. E. Renner; capital, $60,000.

The Chicago Steam Pump & Machine Co., Chicago, has been incorporated with $2,500 capital to engage in the manufacture of pumps. H. L. Rohe, Herman Dombrosky and Robert Fahner are the incorporators.

The Grenada Machine Works Co., Grenada, Miss., has been organized with a capital of $10,000 for the purpose of erecting a machine shop and dealing in mill supplies. Officers have been elected as follows: G. B. Jones, president; D. S. Watson, vice president; W. A. Rock, manager; and C. B. Bolton, secretary and treasurer. A machine shop, 30 x 140 feet, is to be built.

The Springfield Bridge & Iron Co., Springfield, Ill., has increased its capital from $10,000 to $35,000.

The Maxwell & Fitch Co., Rome, N. Y., has been organized with $12,000 capital to engage in the manufacture of gas engines. H. B. Maxwell and L. M. Fitch are the incorporators.

The Hayden Automatic Block Machine Co., Columbus, O., has been incorporated with $16,000 capital. W. B. Hayden, N. B. Marple, L. D. Lilley, F. W. Prentiss and G. Jaeger are the incorporators.

The Walker Steel Range Co., of Windsor, Can., has been incorporated with $75,000 capital to engage in the manufacture of steel ranges. H. D. Walker, J. A. Straight, A. Stoll, D. B. Fisher and Wm. Horne are the incorporators.

The Von Serkey Self-Starting Gas Engine Co., of Oakland, Cal., has been incorporated with $50,000 capital to engage in the manufacture of gas engines. J. Von Serkey is president; Herman Bloom, vice president; H. A. Parkhurst, secretary; and Charles F. Girard, treasurer.

The Magney Engine Co., of Los Angeles, Cal., has been incorporated with $50,000 capital to engage in the manufacture of the Magney rotary engine. J. P. Magney, George Gartling, E. Hunter, James Thomson and H. C. Aldrich are the incorporators.

The Continental Gas Machine Co., of Minneapolis, has been incorporated with $60,000 capital. I. D. Cooper, R. G. Ford, W. E. Uord and H. B. Cornish are the incorporators.

The Ohio Stove Co., of Marysville, O., has been incorporated with $5,000 capital to engage in the manufacture of stoves. G. E. Prosser, J. G. Reynolds, W. S. Weston and W. D. Weston are the incorporators.

Fires and Accidents:—

The Metcalf Machine shops at Quincy, Pa., owned by the Geiser Mfg. Co., of Waynesboro, were destroyed by fire last week, entailing a loss of $30,000.

The fire which started in the carpenter shop of the Riverside Iron Works, Kansas City, Kan., May 27, resulted in the loss of about $4,000 on building and contents. Loss is covered by insurance.

New Construction:—

The Grenada Machine Works, Grenada, Miss., are completing an up-to-date machine shop and expect to do a general machinery business, including repairs of all kinds and dealing in boilers, engines and general mill supplies.

The new building which is being erected by the Missouri Moline Plow Co., St. Louis, Mo., will be of stone and brick construction, 80 x 150 ft., six stories and basement, to be used as a storage building, which will also include show rooms and offices.

The Kirkham Motor Works are to move from Taggarts to Bath, N. Y., and will erect a new plant at the latter place.

Wallace C. Johnson, consulting engineer of the Niagara Falls Hydraulic Power & Mfg. Co., has been engaged by the Sientere Viva Mining Co., of Bluefields, Nicaragua, to prepare plans and specifications and to construct and equip an extensive electrical power development and transmission system in the locality of Bluefields.

The plant of the Locomotive & Machine Works, at Montreal, Canada, recently taken over by the American Locomotive Co., will be enlarged. The principal addition will be to the foundry, which will double its capacity.

Gohmann Bros. & Kahler, of New Albany, Ind., have increased their capital stock from $10,000 to $25,000, to provide for the erection of an addition to their foundry.

The National Engine Co., Rockford, Ill., at present occupying a leased building, will erect a building of its own before the end of the year. A site has been purchased.

The Phoenix Iron Co. has commenced erecting the structural work for the new threading mill of the Reading Iron Co., on South street, Reading, Pa. It is expected that the mill will be ready for operation early in the fall.

The Buckeye Engine & Foundry Co., now of Aurora, Ill., will erect a plant at Joliet, Ill. One building will be 50 x 210 feet, and another 60 x 80 feet. G. J. Buckeye is the general manager. The company will manufacture traction and stationary engines and will employ about 75 men.

The Amsler Engineering Co., of Pittsburg, has secured a contract from the W. H. Hamilton Co. for a 20-ton continuous tank furnace at its Charleroi plant. The company

is putting in a new cap for the Warner Glass Co., McDonald, Pa., and is making extensive repairs for the Flaccus Glass Co., at Tarentum, Pa. It is also relining a blast furnace stack and four hot stoves for the American Steel & Wire Co., of Cleveland.

The New York Central's car shop No. 5, at West Albany, N. Y., which was partly destroyed by fire in May, will be rebuilt in practically the original form.

The Perkins Machine Co., which recently moved from South Boston to a larger plant at Warren, Mass., put on a night force Tuesday, May 31, in order to fill the large amount of business the company has on hand.

Orders for 3,000 steel cars were placed by the Harriman lines at New York last week. The Pressed Steel Car Co. received 2,000 of the cars and the American Car & Foundry Co., the remainder. The Pressed Steel Car Co. has orders on its books for about 4,000 steel cars, and the plant at McKees Rocks, Pa., has been placed in full operation. Orders recently booked call for 250 cars for the Chicago, Lake Shore & Eastern, 250 for the Illinois Central and 500 for the Seaboard Air Line.

General Industrial Notes:—

The firm of Howard & Roberts, boiler makers, Buffalo, N. Y., has been succeeded by Howard Bros.

The plant of the Conrad Motor Carriage Co., Buffalo, N. Y., has been sold to E. R. Thomas, president of the E. R. Thomas Motor Co., of that city, by the trustees acting for the creditors.

In the month of May the hoop mill of the Carnegie Steel Co., Monessen, Pa., broke all records by producing 4,366 gross tons. The best previous record was 4,203 gross tons. The mill is in charge of A. B. Scott.

The Woodward Iron Co., Birmingham, Ala., will shortly commence the erection of 400 coke ovens, at its plant near Bessemer, Ala. The company's new furnace will be blown in next October.

The plant of the George Foundry & Machine Co., Rome, Ga., has been purchased by Harry Meikleham, Reuben Towers, J. W. Watkins, Anderly Marshall and others. It is to be greatly improved.

Operations at the plant of the Standard Steel Car Co., Butler, Pa., have been resumed after a brief shut down, due to a strike of the riveters.

The Page Woven Wire Fence Co., Monessen, Pa., resumed operations in its open-hearth department this week after an idleness of nearly a year.

The New York Lock Co., New Haven, Conn., was closed by order of the temporary receiver appointed last week. This company is capitalized at $300,000 and H. L. Cowles, of New York, is president.

The Niles furnace of the Carnegie Steel Co., Niles, O., was blown out this week. This company has three furnaces in operation at Youngstown, and the iron from this stack is not required at present.

The Henry Weyand Co., Inc., Waterbury, Conn., succeeds to the business of Henry Weyand, manufacturer of architectural sheet metal work.

The M. D. Knowlton Co., recently incorporated, of Rochester, N. Y., has taken over the entire business of the firm of Knowlton & Beach. This firm manufactures a large line of machinery for making paper boxes and cutting paper. The new company has introduced new features and installed new machinery for the same line of manufacture.

The Ben-Steele Weigher Mfg. Co., recently organized at Peoria, Ill., will manufacture grain weighers, loaders and baggers. The officers are: Ben M. Steele, J. W. Ashworth and Edwin Leisner, all of Peoria, Ill. Mr. Steele is an inventor who has spent a number of years in the mechanical department of the grain weighing business. He is an expert mechanic and has invented machines which have been very successful.

The Hance Brown Casting Co., Columbus, O., recently incorporated, will operate a general jobbing foundry. The company has acquired a plant to which it has built an addition, a corrugated iron building for the cupola and additional molding floor.

The stockholders of the Youngstown Furnace Co., Youngstown, O., have elected the following directors: Frank H. Jennings, of Akron, O.; Fred Mattmueller Jr., of Cleveland; and Leon Gschwind, Wm. Ramn and Charles Ohl, of Youngstown, O. The directors have elected the following: President and general manager, Leon Gschwind; vice president and general sales agent, Wm. Ramn; secretary and treasurer, Chas. Ohl. At present the work will be done by contract, but by fall, if the business justifies it, and if a suitable site can be obtained, a modern foundry, pattern shop, tin shop, warehouse and possibly a plating shop will be built. The pattern shop machinery will be driven direct, each machine with a motor. The company will manufacture hot air furnaces, steam and hot water heaters, also stoves and steel ranges. The patents are those of Mr. Gschwind. The present office of the company is 504 Dollar Savings Bank building.

The fire which recently visited the plant of the Newark Tube & Metal Works, Newark, N. J., was of small consequence and the plant is running again as usual.

The Portland Wire & Iron Works, Portland, Me., will immediately begin the erection of a modern plant, to replace the works recently destroyed by fire.

The Claire furnace of M. A. Hanna & Co., Sharpsville, Pa., was blown out last Saturday. Extensive repairs will be made and a new cast house is to be built.

The Columbia Contracting Co. has been awarded the contract for the erection of the Duquesne Elevated road of the Pennsylvania Railroad Co., to be built at Pittsburg. The contract for the steel will be placed on June 13. About 5,000 tons will be required.

The plate mill at the Schoenberger plant of the American Steel & Wire Co., Pittsburg, has been shut down for want of orders.

A number of the steel and finishing mills at New Castle and Sharon, Pa., were compelled to shut down a few days last week on account of the high water.

The plant of the Keystone Scale Works, Beaver Falls, Pa., which has been in the hands of the court on account of bankruptcy proceedings, has been sold to John H. Ohsman and others, of Beaver Falls. The price paid for the plant was $10,000 and it is to be placed in operation at once.

The Power Mining & Machinery Co. has just received a contract for the equipment of a new power plant for the Wellington Meat Export Co., a British concern which operates large works at Wellington, New Zealand. The contract is valued at $125,000 and covers gas generating and electrical machinery.

The Robb-Mumford Boiler Co., 170 Summer street, Boston, Mass., has increased its capital stock for the establishment of a new plant in the vicinity of Amherst, N. S.

The plant of the United States Steel Co., at Everett, Mass., has been sold at auction for $50,000, to the International Trust Co., trustee for the bondholders, which acquired the property for a third of the amount represented by the outstanding bonds. The company had an authorized capital of $3,000,000. The plant has one 24-pot crucible steel melting furnace which first made steel in 1899. Annual capacity, 400 gross tons. It also has two 15 gross ton acid open hearth steel furnaces, built in 1900. Annual capacity, 5,000 gross tons. The product is steel casting from ¼ of a pound to 6,000 pounds.

Paul M. Mowrey, for the last three years connected with the Merchants' Trust Co., New York, as adviser on industrial investments, has assumed the office of vice president of the Engineering Co. of America, 74 Broadway. Mr. Mowrey has been identified with the engineering and contracting business since 1888, when he became connected with the Edison Illuminating Co. One of his enterprises was the purchase and consolidation of the street railway and power companies of Richmond, Va., which were later turned over to Frank Jay Gould.

At a meeting of the stockholders of the American Car & Foundry Co., to be held in New York June 28, the proposition for classification of directors will be adopted. The object of dividing the directors into classes to serve for different terms is to guard against any sudden change in the management.

Feed Water Purification

A user of our Cochrane Feed Water Heaters and Purifiers recently wrote us that he cleans his heater at least every ten days and takes from the heater at each cleaning several hundred pounds of mud and scale. Many steam users do not realize what can be accomplished in the way of purification by means of a Cochrane Heater nor do they realize that it is impossible to obtain the same degree of purification with any form of closed or pressure heaters.

The Cochrane Heater will materially improve the quality of any feed water—no matter how bad. Provision is made in the Cochrane Heaters by means of large tray surface, filtering material and liberal water-carrying capacity for detaining such of the carbonates of lime and magnesia as are brought down by the action of the heat in the exhaust steam driving off to the atmosphere the carbonic acid gas in the water. A skimmer extending practically the full width of the heater carries to waste the lighter impurities. Purification is also obtained by saving and adding to the feed supply the pure condensation of the exhaust used in heating the water. It is not within the province of the closed heater to obtain this purification, and it is doubtful whether any other heater than the Cochrane makes such full provision for getting all of the purification that can be obtained by mechanical means.

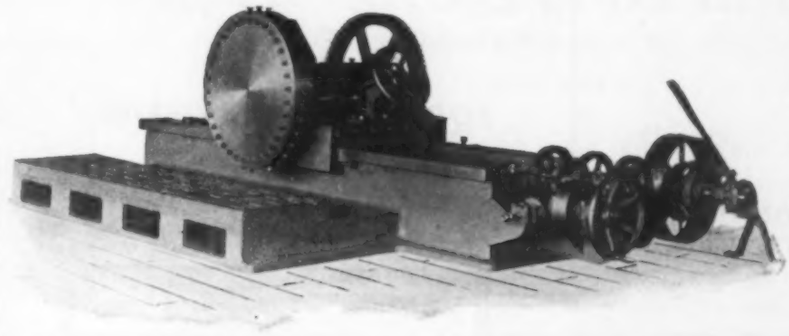
In many cases the purification which can be obtained by the use of a Cochrane Heater is sufficient to pay a handsome return on the cost of the heater, not counting the other advantages possessed by these "Cochranes."

HARRISON SAFETY BOILER WORKS, Clearfield and 17th Sts., Philadelphia, Pa.

Manufacturers of Cochrane Feed Water Heaters, Cochrane Steam and Oil Separators, and the Sorge-Cochrane Systems.

CLEVELAND ROTARY PLANER No. 2

WITH TABLE



This machine is built with various sizes of cutter head varying from 36 in. in dia. to 60 in. in diameter.

Cutting tools shown on face of cutter head are made so that it is only necessary to grind them on the end.

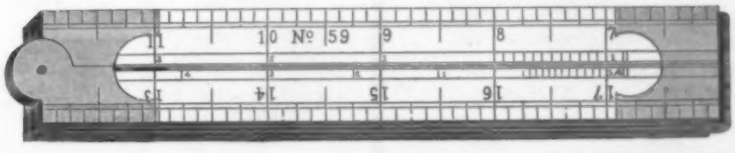
This machine is very useful in planing or facing columns, heavy castings, or ends of large pipe.

We think this machine is superior to any similar machine on the market, and can furnish plenty of testimony to that effect.

THE CLEVELAND PUNCH & SHEAR WKS. COMPANY
Cleveland, O. U. S. A.

Our name guarantees quality

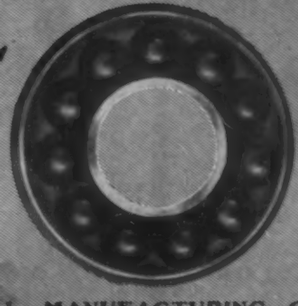
BOXWOOD RULES



WELL FINISHED, ACCURATE, RELIABLE

Cleveland, Ohio. THE UPSON NUT CO. Unionville, Conn.

STEEL BALLS



The test of quality lies in service. The best balls are known as "High Duty." We make them.

Something more than a micrometer is needed to distinguish good balls from bad ones.

FEDERAL MANUFACTURING COMPANY
CLEVELAND BALL FACTORY—Cleveland

AMERICAN STEEL HOOP COMPANY

GENERAL SALES OFFICES:
CARNEGIE BUILDING, PITTSBURGH, PA.

DISTRICT SALES OFFICES:

ATLANTA: - - - - Equitable Building
BOSTON: - - - - Telephone Building
BUFFALO: - - - German Insurance Building
CHICAGO: - - - - - The Rookery
CINCINNATI: - - - Union Trust Building
CLEVELAND: - - - Perry-Payne Building
DENVER: - - - 101, 102 Boston Building
DETROIT: - - - - Union Trust Building
NEW YORK: - - - - Empire Building
PHILADELPHIA: - - - Harrison Building
SAN FRANCISCO: - - - 226 Market Street
ST. LOUIS: - - New Bank of Commerce Building
WASHINGTON: - - National Safe Deposit Building
ST. PAUL: - - - - Pioneer Press Building
NEW ORLEANS: - - - Hennen Building

FOREIGN SALES OFFICES:

CITY OF MEXICO: - - - 924 Apartado
MONTREAL, CANADA: - Bell Telephone Building
SIDNEY, N. S. W.: Mutual Life Bldg,, 14 Martin Place

A SINGLE MACHINE

may be all you want just now. Send in your order — it will receive the same prompt attention as a larger one.

WIRE MILLS
CHAIN FACTORIES

A COMPLETE INSTALLATION

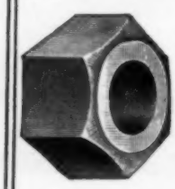
the whole thing from A to Z may be your need. We will furnish you an equipment unequaled anywhere.

1856 Nearly 50 years' experience behind our goods **1904**

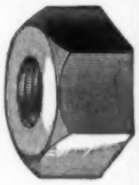
Write for prices, stating capacity wanted

THE TURNER, VAUGHN & TAYLOR COMPANY
Cuyahoga Falls, O., U. S. A.

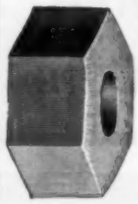
HOT PRESSED **"MILTON"** **COLD PUNCHED**



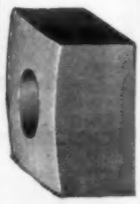
Made of double refined bar iron, well finished and every one true to size. That's one reason why you should try these nuts, and then—



NUTS



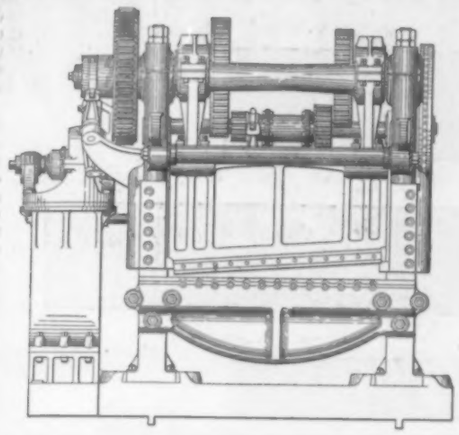
The price will interest you



& WASHERS

"MILTON" brand
are made from bars rolled especially for the purpose, and are true to gauge
THEY WEAR INDEFINITELY

The Milton Mfg. Co.
Milton, Pa.



Mackintosh, Hemphill & Co.

FORT PITT FOUNDRY.

Twelfth and Etna Streets, Pittsburg, Pa.

MANUFACTURERS OF

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CORLISS REVERSING BLOWING **ENGINES**

Iron, Steel and Brass Castings.

MISCELLANEOUS.

Iron and Steel Works Machinery.

AMERICAN IRON & STEEL MFG. CO.

General Offices at LEBANON, PA., U.S.A.

MANUFACTURERS OF

Merchant Bar Iron and Steel

(ANNUAL CAPACITY ABOUT 150,000 TONS)

ALSO EVERY VARIETY OF

Machine Bolts, Nuts, Washers, Turnbuckles, Lag Screws, Railway and Dock Spikes, Harvey Grip and other Railway Track Bolts. Boiler, Ship and Structural Rivets. Car Forgings and Rods and Irons for Bridges, Buildings, Etc., Etc.

This Company owns and operates the works formerly owned by J. H. STERNBERGH & SON, Reading, Pa. NATIONAL BOLT, NUT AND RIVET WORKS, Reading, Pa. LEBANON IRON CO., Lebanon, Pa. EAST LEBANON IRON CO., Lebanon, Pa. PENNSYLVANIA BOLT AND NUT CO., Lebanon, Pa.

"The Best is the Cheapest"

MF

Trade Mark

The BEST ROOF is made of

MF Roofing Tin

It has held during the last sixty years the **Most Favored** and leading place in the race for superiority in Roofing Materials

AMERICAN SHEET & TIN PLATE CO. APOLLO BEST BLOOM TRADE MARK REGISTERED PITTSBURGH

The BEST METAL CORNICES

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